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AND HOW TO AVOID IT

Percent of revenue is the wrong measure of IT value. You can do better.

BY CHRISTOPHER KOCH

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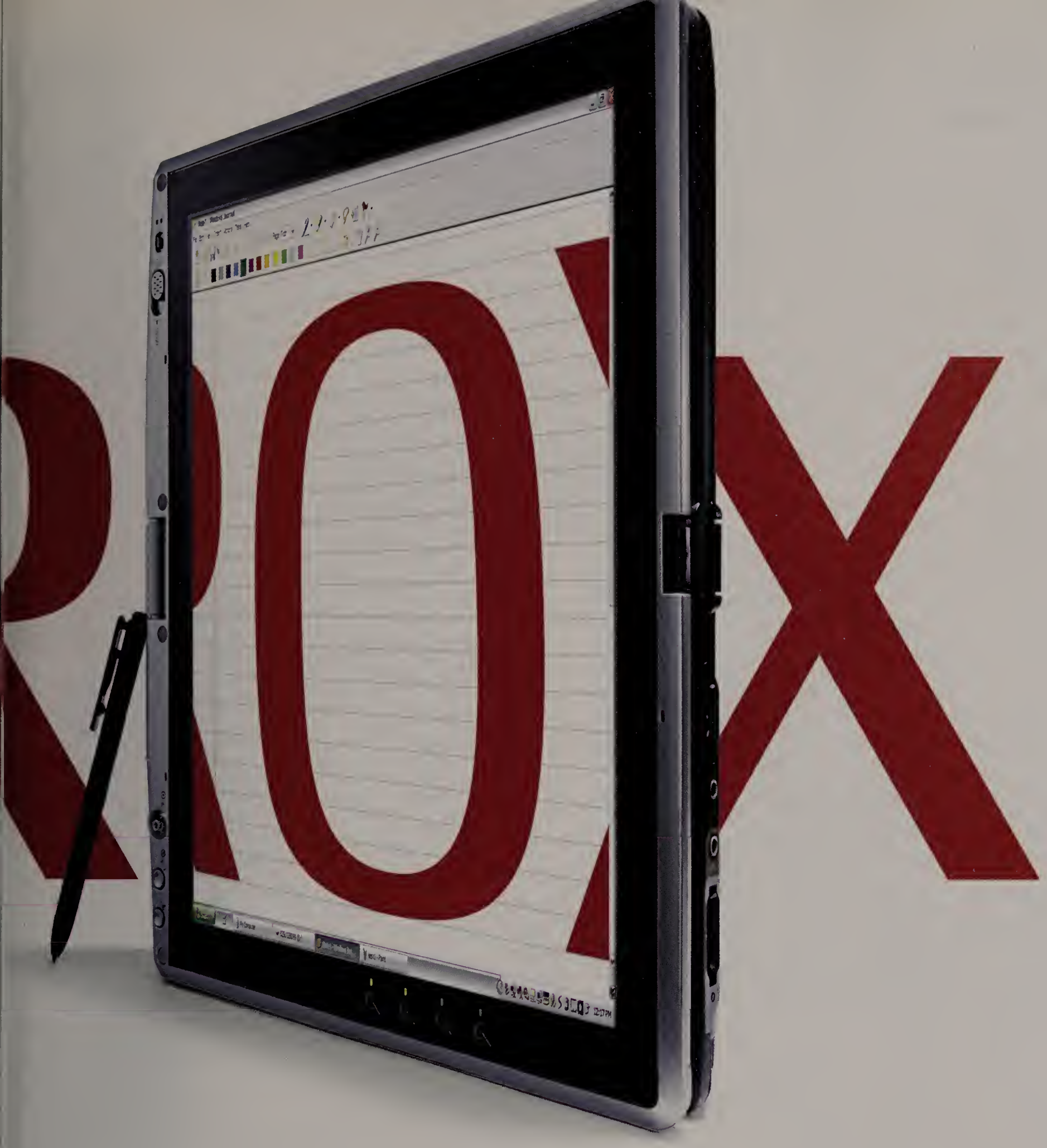

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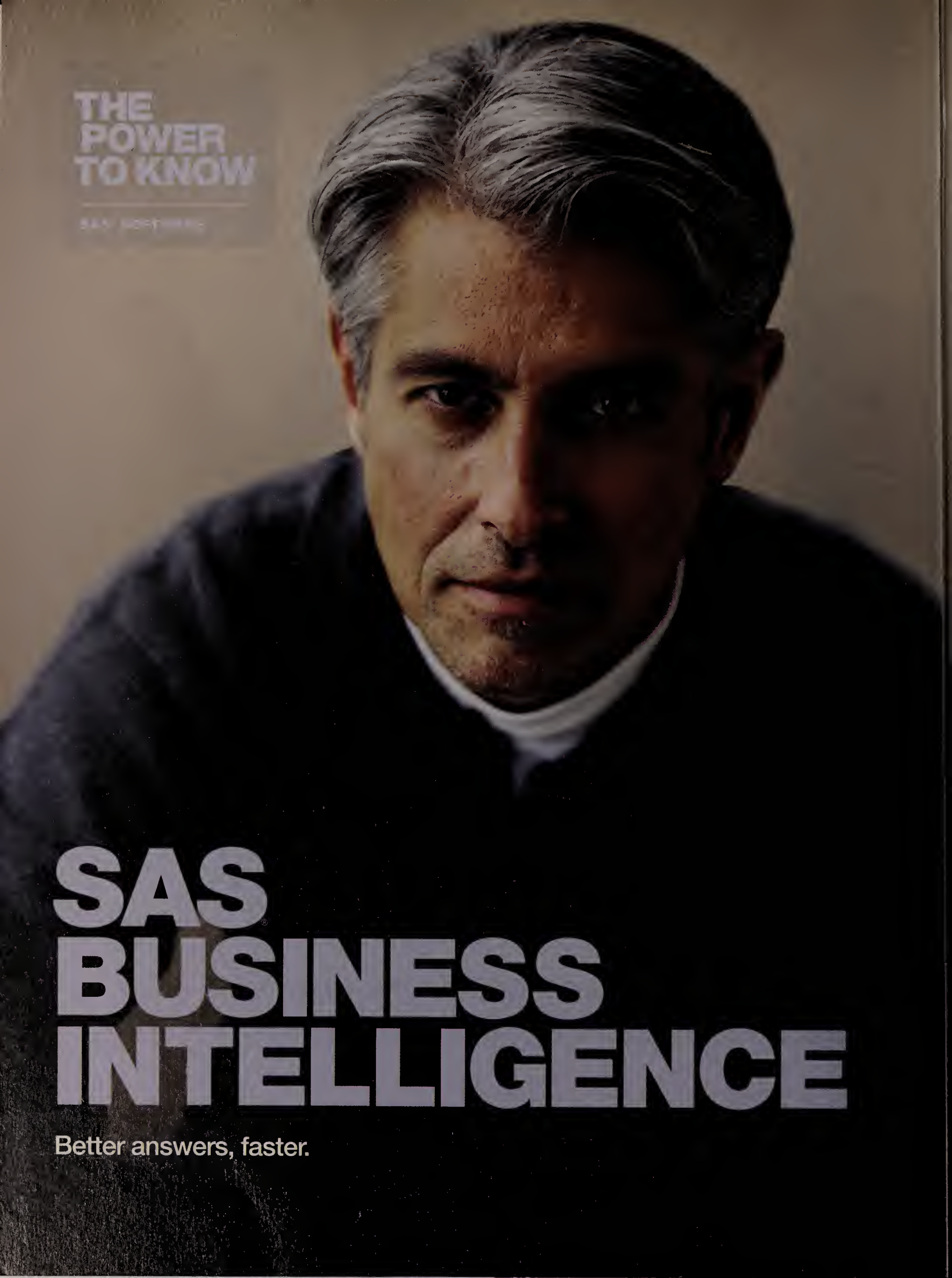
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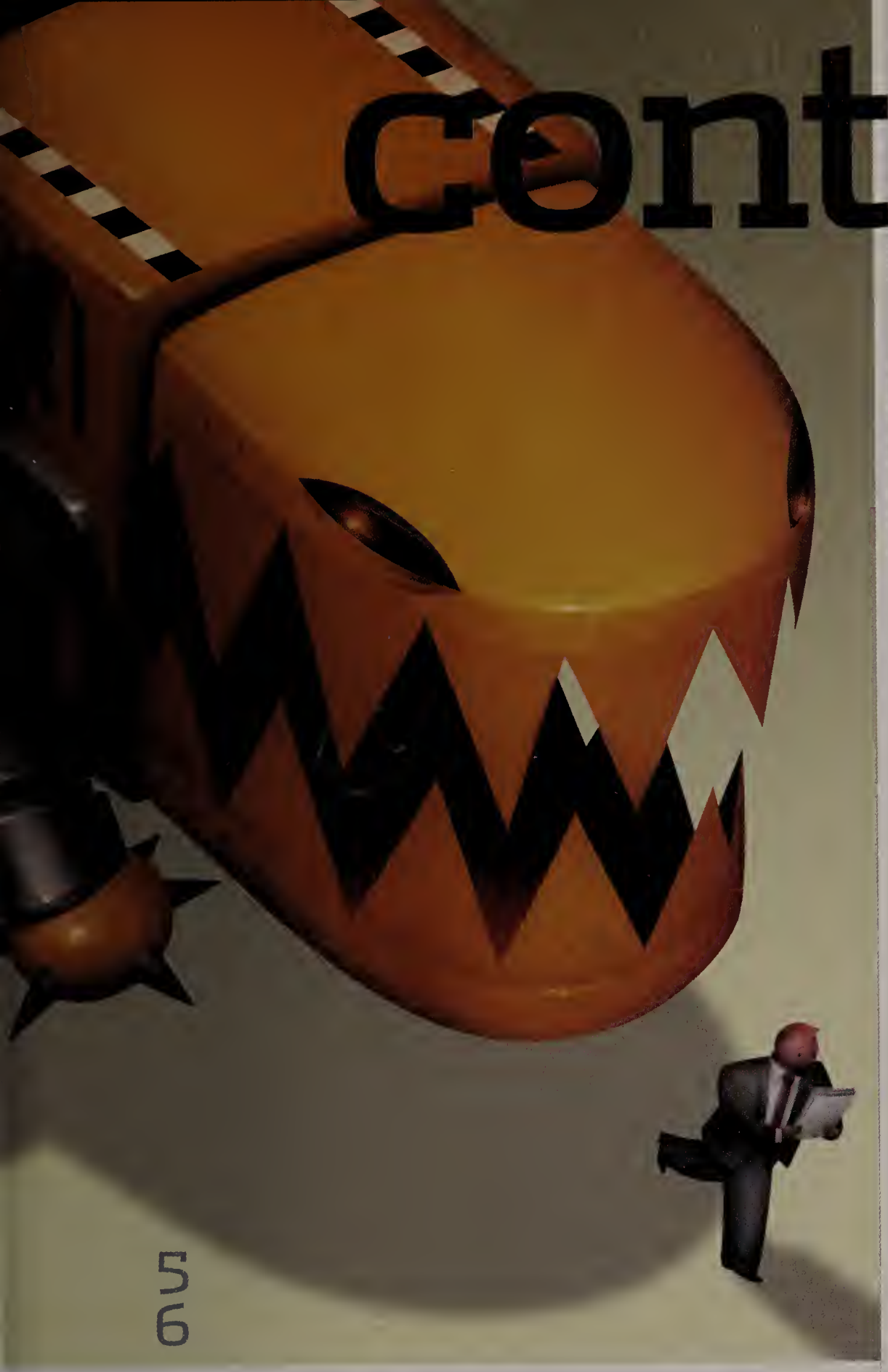

Wireless

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A growing number of cities and towns want to develop their own public Wi-Fi networks. But they face stiff opposition from telecom and cable providers.

By Susannah Patton

MID-MARKET: THE EVOLVING ENTERPRISE

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A strong argument can now be made that doctors in small and midsize practices should invest in electronic health records. Here's how to get your physicians on board.

By Michael Fitzgerald

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HOW TO CUT $100 MILLION IN I.T. COSTS AND SAVE AN AIRLINE |

www.cio.com/040106

The US Airways and America West merger was based on keeping IT simple and cheap. But in the airline business, nothing is simple.

By Stephanie Overby

IT Spending

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Calculating IT spending as a percentage of overall revenue is easy, popular...and misleading. There's gotta be a better way. In fact, there are several.

By Christopher Koch

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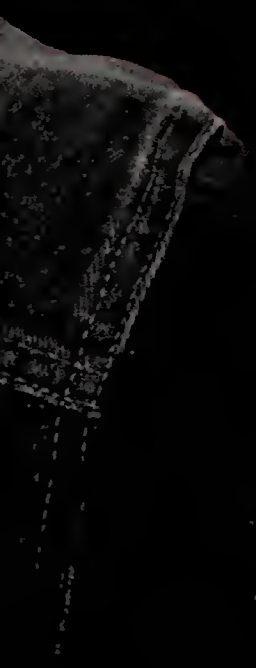

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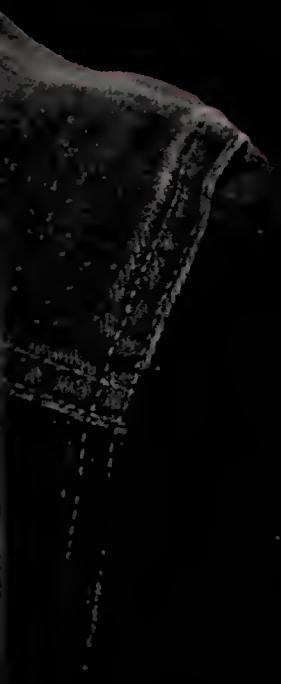

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The Big Spend

The percentage of overall revenue you spend on IT tells you only what you're spending, not how well you're spending it. And what's the use of that?

CIOs, by and large, did not get into IT for the fun of budgeting, and they welcome the fact that their businesses seem to be emerging from the bad old days when good IT meant little more than low-cost IT.

We hear it over and over again: The CIO role has become increasingly strategic. No longer an order taker awaiting the business's sometimes ill-defined demands for this, that or the next capability, the CIO's job today is to drive innovation, to use IT to devise new products and services that can generate new revenue for the business, or at the very least, to improve dramatically the enterprise's efficiency and productivity. The key idea here is the importance of differentiating your company from the competition, and the growing belief that IT is the best way to achieve that.

Companies that spend much less on IT than the average for their industry are three times more successful than those in the middle. But companies that spend much more than the average are six times more successful.

Unfortunately, money (still) keeps getting in the way.

As sophisticated as the technology and its countless uses have become, all too often the benchmark used to determine the proper level of an enterprise's IT spending is alarmingly simplistic: the percentage of overall revenue for which IT accounts. As Executive Editor Christopher Koch reports in this issue's cover story, "The Metrics Trap...and How to Avoid It" (Page 56), benchmarking IT spending by industry averages produces average IT departments. And average IT departments do not generate competitive advantage.

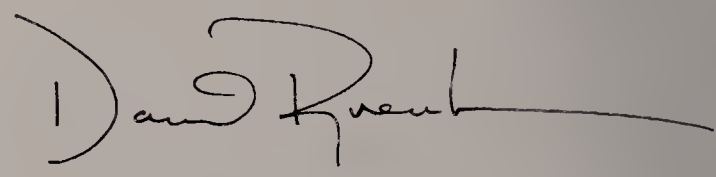
In fact, a recent survey Koch dug up found that companies that spend much less on IT than the average for their industry are three times more successful than those in the middle.

But companies that spend much more than the average are six times more successful.

Benchmarking IT spending as a percentage of revenue is a truly useless metric. Unfortunately, according to Koch, it remains the most popular way to evaluate IT spending, and also unfortunately (as most of you already know), it doesn't say anything about how effective or productive your spending is. Even more unfortunately, benchmarking by percentage of revenue casts IT in the role of a cost to be controlled, defining success simply as lowering the percentage over time.

Complaining about this metrics trap is of limited utility. What is useful is doing what some of the CIOs Koch interviewed have done: They've created their own metrics to measure what they're supposed to be doing—adding value—and not what they aren't, increasing the cost of doing business.

Give some of these metrics a trial run. (You know your peers will.) Let us know how they work out for you.



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The Myth of Web 2.0

It's not that it's not real, it's just that Web 1.0 is more real

All the talk these days is about Web 2.0 and the ways business will be able to leverage it to foster commerce in 2006 and beyond. But I recently had a Web 1.0 experience that was all too typical.

I was visiting my in-laws. I needed to log on to the Web and sat down at their PC to do so. I finally got on but...it was an agonizingly slow process. My in-laws connect to the Web through a dial-up modem.

Of course, most *CIO* readers have high-speed connections to the Internet at work and probably at home too. But the experience I had at my in-laws is the norm for your customers. In fact, according to published reports, about 70 million of the 120 million households in America with an Internet connection log on via telephone dial-up.

That's 70 million households—and hundreds of millions of customers—for whom going online is both tedious and time-consuming. Consequently, it's not all that easy to sell them anything through the Web no matter how user-friendly your site may be. But that could change very quickly.

Get out your pens and write down these three letters: BPL. It's a term coined by the Federal Communications Commission and it stands for broadband over power lines. Type BPL into your favorite search engine and learn all you can.

Until BPL came along, households had two major options for high-speed connectivity: DSL lines from telephone companies and cable lines from cable operators. Now BPL brings a third option that is both exciting and incredibly simple.

BPL technology has the potential to bring high-speed Internet connectivity to any home that has a power line connected to it and is equipped with a BPL modem. It plugs into any electrical outlet. The entire town of Manassas, Va., is connected via BPL, and parts of New York City and Cincinnati are also experimenting with it.

BPL is an electrifyingly simple approach to getting more American households wired for the coming broadband world of Web 2.0. I would recommend you call your local utility to ask about it.

Gary J. Beach

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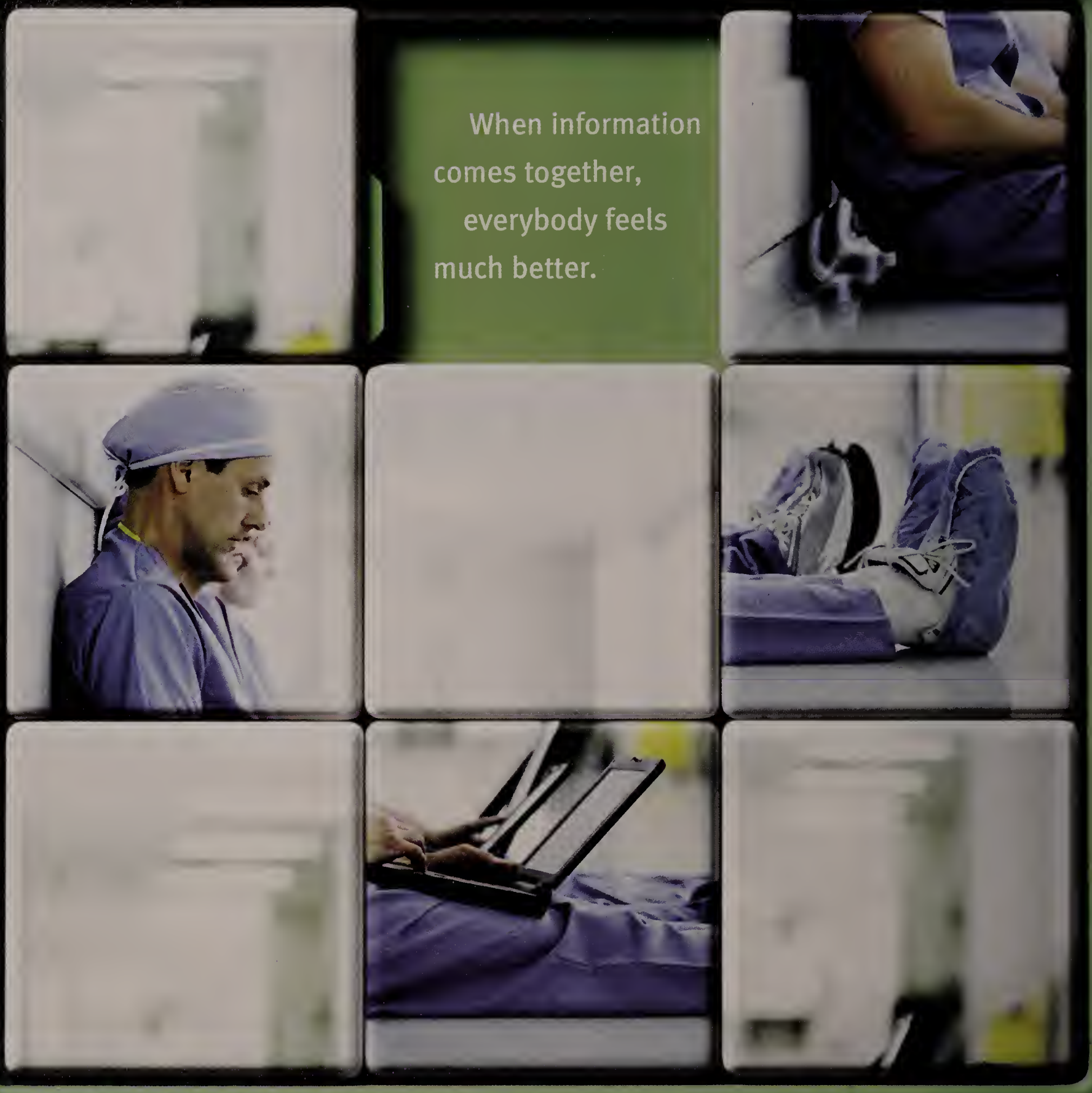

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EDITED BY ELANA VARON | NEW * HOT * UNEXPECTED

Silicon Valley, Unwired

WIRELESS NETWORKING **The region that spawned the microprocessor and helped wire the world now wants to unwire itself.**

A coalition of local government officials and businesses including Intel wants to set up outdoor wireless Internet access over a broad area around Silicon Valley. The proposed network, which would cover about 1,500 square miles, is envisioned for many purposes, including improving government services, attracting conventions and business, and helping residents get Internet access, according to Richard Ajluni, director of external relations for the group spearheading the project, which calls itself Joint Venture: Silicon Valley Network.

The proposal is also backed by the San Mateo County Telecommunications Authority (Samcat), a regional body for telecommunications and cable TV policy that represents 17 cities south of San Francisco in San Mateo County. In addition, Santa Clara County and the cities of Los Altos Hills, Los Gatos, Menlo Park, Milpitas, Morgan Hill, Palo Alto, Santa Clara and Santa Cruz will make financial contributions and participate in the project. The coalition is seeking participation

Continued on Page 22

Help for ChoicePoint ID Theft Victims

PRIVACY In January, the Federal Trade Commission levied a $15 million penalty against data broker ChoicePoint because the company allowed criminals posing as customers to access the personal data of 163,000 consumers. Of that sum, $5 million is being used to create a fund for victims of fraud or identity theft due to the data breach. Now, the FTC is trying to figure out how to find victims and quantify their losses.

"We really don't have anything to compare it to," says Beth Givens, founder of the Privacy Rights Clearinghouse. "Victims are protected by federal law from having to pay fraudulent charges, so the loss is primarily of time."

But Chris Keller, an attorney with the FTC's Division of Privacy and Identity Protection, says that the fund is unlikely to be used to reimburse victims for lost time or other intangibles (with the exception of unpaid time the victims had to take off work). The FTC is still working out exactly which losses *will* be covered. One qualified expense: the cost of credit monitoring for victims who discovered the fraud before ChoicePoint notified them and offered credit monitoring for free. Still a question mark: legal fees.

Meanwhile, the FTC is working with law enforcement and creditors to determine whose information has been misused. The FTC says there have been at least 800 cases of identity theft so far (a number that ChoicePoint disputes). Of particular concern are the 10,000 consumers for whom ChoicePoint gave out full credit reports, "the richest source of data for identity theft," Keller notes.

–Sarah D. Scalet

PHOTO BY iSTOCKPHOTO

Social Responsibility Is Part of His Job

Fran Dramis, CIO and e-commerce officer at BellSouth

COMMUNITY SERVICE

After hurricanes swept the Gulf Coast last summer, Fran Dramis, chief information and e-commerce officer at BellSouth, helped establish three relief centers equipped with computers and phones that victims could use to contact their families. Also under Dramis's leadership, the company established a disaster-relief fund and encouraged employees to "adopt" an affected family.

Dramis's community-focused attitude is the reason why Computers For Youth (CFY) chose him as its first CIO of the Year.

"Technology is a critical and underutilized tool for solving many of society's ills," says Elisabeth Stock, president of CFY, a New York City–based organization that donates computers to middle-school students from low-income families and teaches them, their teachers and their parents how to use them. Social responsibility among corporate executives used to be something that was expected only from CEOs, Stock says, but the CIO's role in corporate America has become increasingly important.

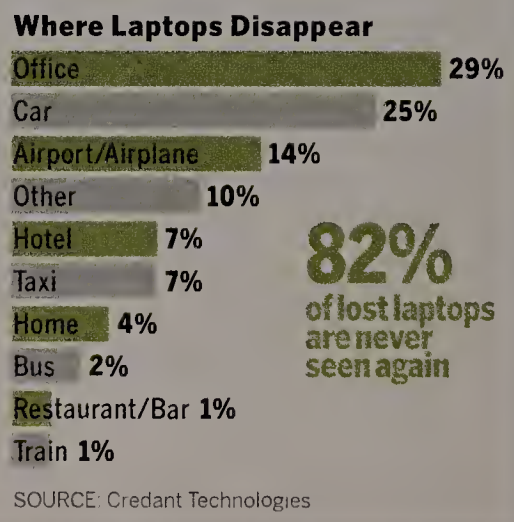
Dramis encourages his senior executive peers to promote BellSouth's e-learning program, a Web-based tutoring program that Dramis hopes will level the education opportunities for underprivileged children. In Florida, more than 21,000 kids have increased their comfort level using technology while learning subjects such as algebra from remote teachers. To Dramis, making sure students have computers and are comfortable using them is an essential way he can give back to the community.

"I'm not Mother Teresa," he says, but notes that it's important for children to have access to the latest technology. "The Internet is becoming a place, not just a tool, and especially for kids," he says. "Schools should be there. E-learning has the potential to break down the social and economic barriers to success and growth of children." *–Margaret Locher*

Black Holes for Laptops

MOBILE COMPUTING

Where is the number-one spot that people lose their laptops? Why, the office, of course. That's according to a recent study by Credant Technologies, a mobile security vendor. The office beat out other, more obvious destinations such as airports and hotels.



SOURCE: Credant Technologies

Silicon Valley

Continued from Page 21

and funding from 26 other cities and counties in the area.

A working group created for the project, Wireless Silicon Valley Task Force, has chosen Intel to develop an RFP to build the network. Intel was expected to finish collecting data by the end of March, and the RFP is expected to be issued in a couple of months. Intel's Solutions Services division will donate consulting services to the project, as it has for Portland, Ore., and other cities. Intel won't respond to the RFP as a vendor, according to Ajluni.

The RFP won't prescribe a particular technology or business model, leaving the field open for a variety of respondents to propose different solutions, he says.

Municipal wireless networks are drawing widespread interest among local governments, as well as opposition from some vendors that say governments shouldn't get into the network business. (To learn more about the controversy, read "Wi-Fight," Page 50.)

Based on participation in the coalition so far, areas covered by the network would extend from Daly City, just south of San Francisco (which is planning its own public wireless network), south to Gilroy and Santa Cruz, and from Pacifica on the Pacific coast to Newark, on the east side of San Francisco Bay.

An intercity wireless network would enable city workers and other professionals to get Internet access while on the road and may also bring indoor broadband service to some parts of the region for the first time, says Brian Moura, assistant city manager of San Carlos and chairman of Samcat. The network could help police monitor crime scenes, emergency crews download medical records and government agencies monitor infrastructure such as flood control, Ajluni says.

The high-tech region has the opposite problem from many municipalities, according to Moura: Too many wireless startups have proposed networks in the area to show off their technology, he says. "Having a structured process like this will give us a better way to evaluate those proposals and decide which one is best for our community," Moura says. *–Stephen Lawson*

PHOTO BY KEN HAWKINS

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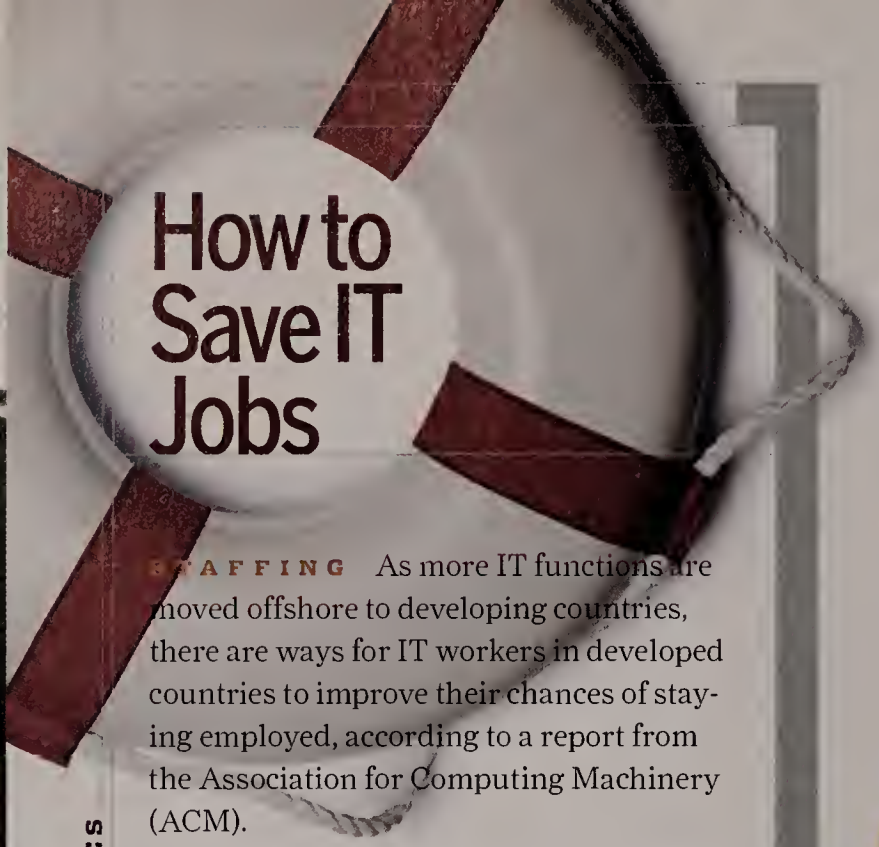


How to Save IT Jobs

STAFFING As more IT functions are moved offshore to developing countries, there are ways for IT workers in developed countries to improve their chances of staying employed, according to a report from the Association for Computing Machinery (ACM).

Savvy students and IT workers already know they should obtain a strong educational foundation, learn the technologies used in the global software industry and keep those skills up-to-date throughout their careers if they want to keep their jobs.

But they need to adopt other strategies if they want to remain in the technology field in the long term, according to the ACM, an international association of scientists, academics and other professionals involved in advancing IT. These strategies include developing good teamwork and communication skills, getting management experience and becoming familiar with other cultures. IT workers can also choose jobs in industries and occupations less likely to be automated or sent to a low-wage country, such as positions that require discretionary judgment or knowledge of trade secrets, the ACM's Job Migration Task Force says in a report titled "Globalization and Offshoring of Software."

One surprising conclusion of the report is that it's not just lower-skilled jobs that are moving offshore: High-level research is also moving from Europe and the United States to India and China, as improvements in graduate education systems in those countries are increasing the number of qualified researchers.

However, the report says, governments in the United States and other developed nations can ensure that good IT jobs continue to be created through policies that promote research and development, improve education, enable foreign scientists and technologists to be employed in these countries, and encourage fair trade.

–Peter Sayer

Cost Cutting No Longer Cuts It

MANAGEMENT REPORT IT managers who focus on cutting costs and driving efficiencies risk working themselves out of a job, according to two recent reports. Instead, technology leaders need to create value by generating revenue.

"If you're 50 years old and you think you're going to be working for 15 more years in IT and your work is based on cost reduction, I'd be worried," says Rob Austin, a professor at Harvard Business School and a Cutter Consortium fellow. In a report for Cutter, Austin says the belt-tightening of the past five years has pushed IT leaders too far into the cost-cutting role. Now, they need to encourage innovation among employees and budget for projects that could create new revenue sources.

The problem is, they don't know how. According to a recent study by Mercer Delta Executive Learning Center, today's enterprise leaders—not only CIOs—have been bred to cut costs in a marketplace that rewarded constant budget trimming. Now that there is nothing left to cut, they are having trouble creating value.

From a survey of 223 senior executives in 44 countries (16 percent of whom are CIOs), Mercer Delta identified four key challenges to generating revenue that business leaders currently face: increased competitive pressure, the need to respond quickly to changing market conditions, the need to innovate and the need to satisfy customer expectations. Nearly one-third of respondents said their companies do not understand well the leadership capabilities required to overcome these challenges. Although 72 percent said their companies plan to close these leadership gaps, only half of the executives surveyed have made sufficient investments to do so.

IF YOU'RE 50 YEARS OLD and you think you're going to be working for 15 more years in IT and your work is based on cost reduction, I'D BE WORRIED.

–Rob Austin, Cutter Consortium

"Companies that recognize that their leaders are a source of competitive advantage are making sure that leadership development is an important investment area," says Tom Knighton, partner at Mercer Delta. "It's becoming an issue that's on the CEO's agenda."

Cutter's Austin says one way IT leaders can adopt a moneymaking mind-set is to list the ways IT could help their company generate revenue and then educate senior management about the importance of such projects. He also recommends remaining open to suggestions from employees who are always looking for new ways of doing things. "These people have the motivation you need to tap to create novel and valuable outcomes," Austin says.

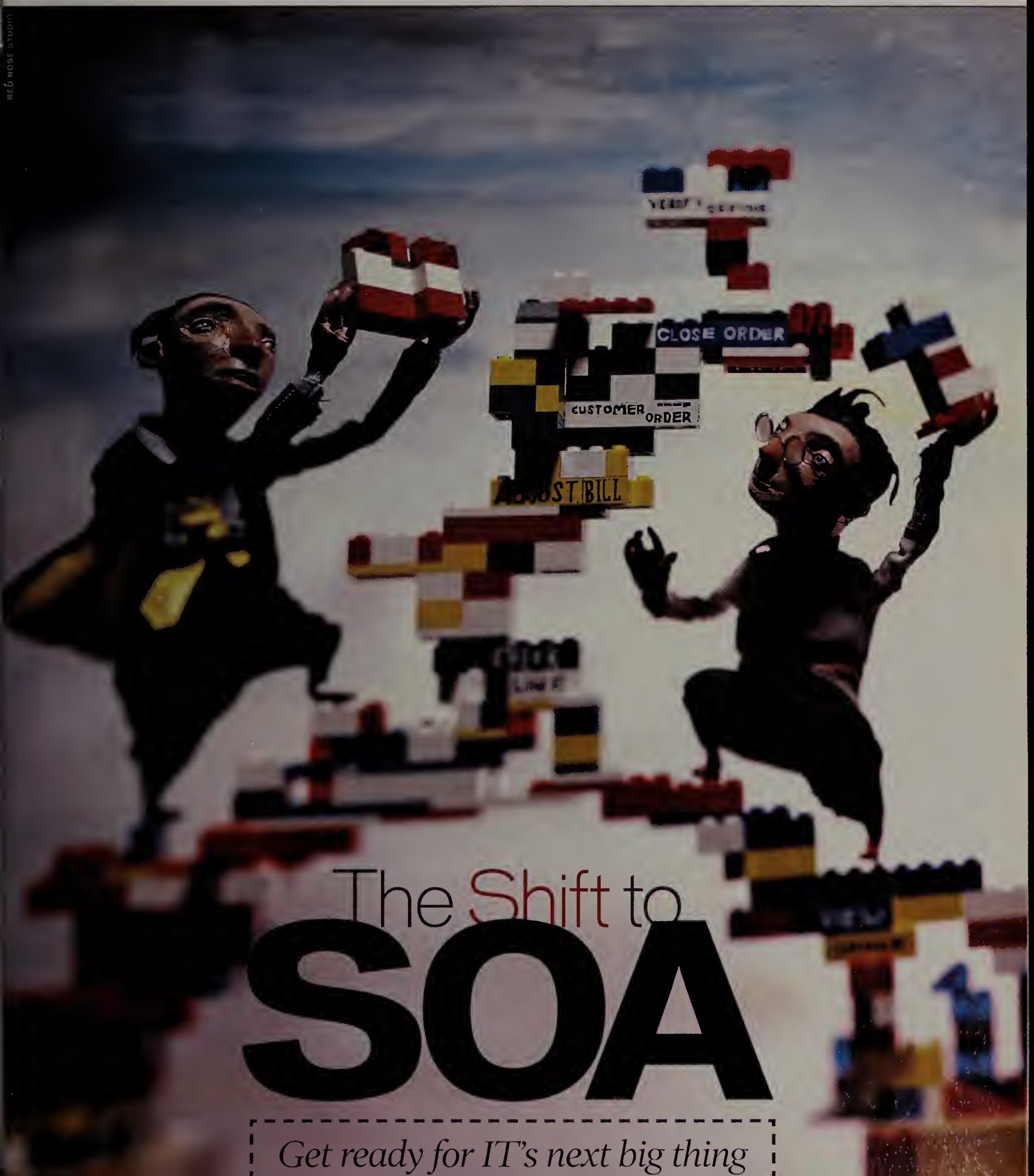
–Susannah Patton

PHOTO BY iSTOCKPHOTO

Vol. 1, Issue 1, April 2006

Next-Gen IT

A SERIES FROM THE EDITORS OF COMPUTERWORLD AND CIO



The Shift to SOA

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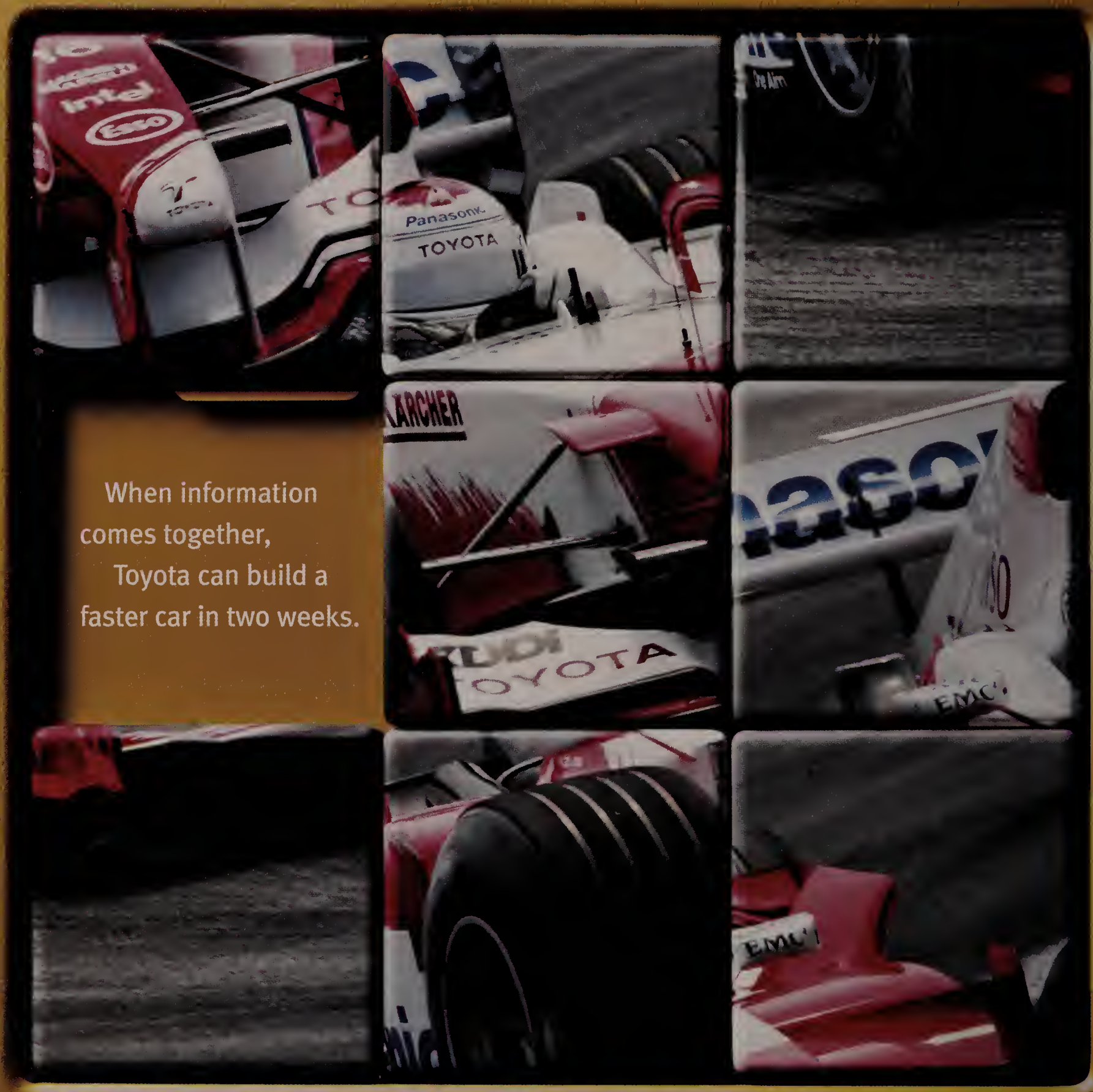

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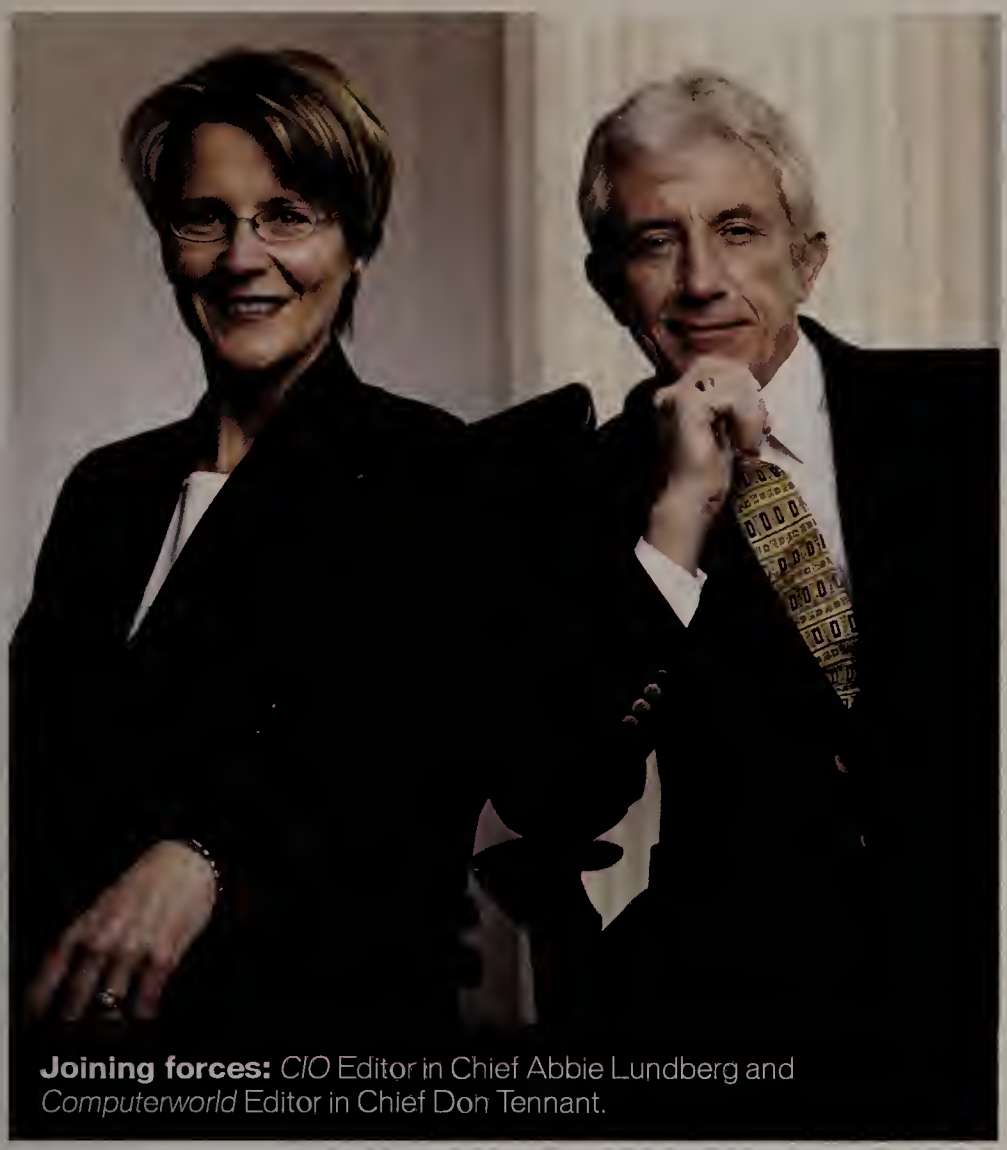

WEBB CHAPPELL

Joining forces: *CIO* Editor in Chief Abbie Lundberg and *Computerworld* Editor in Chief Don Tennant.

Girding for Seismic Shifts

CIO editor in chief
ABBIE LUNDBERG

Computerworld editor
in chief **DON TENNANT**

The metaphor of IT being part of an organization's foundation is no longer apt; the 21st century enterprise is built with information, and the technology that enables its flow, embedded in every beam of the structure. And there are important changes taking place within that core IT framework.

Computerworld and *CIO* have joined forces to explore some of those shifts and what they mean for today's organizations and IT leaders. We'll tell you what is happening, why and what you should do about it.

In this first issue of what we envision as an ongoing series, we cover one of the most profound developments in the history of IT: the shift to a service-oriented architecture.

SOA is the logical conclusion (and the tangible expression) of where IT has been heading for the past 20 years. It integrates business and technology in a truly meaningful way.

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This is particularly critical now, as CEOs turn their attention to top-line growth and innovation while continuing to emphasize efficiency and productivity. SOA serves both the entrepreneur and the bean counter.

To give you a well-rounded view of SOA, we've included a piece on **"Pulling Together an SOA Strategy" (page 4)** and another on **"The SOA Toolbox" (page 10).** We wrap it up with *Computerworld* columnist Mark Hall's take on **"An SOA State of Mind" (page 14).**

In future issues, we'll look at other parts of the corpus IT: subjects like "Rearchitecting the Data Center," "Extending the IT Supply Chain" and "Security for the Next-Gen IT Infrastructure."

We'll be gathering all this content and more in a special online site: **ITNextGeneration.com**. Please visit us there and join this essential discussion of the issues you and your peers are confronting as the next generation of information technology unfolds. ◆

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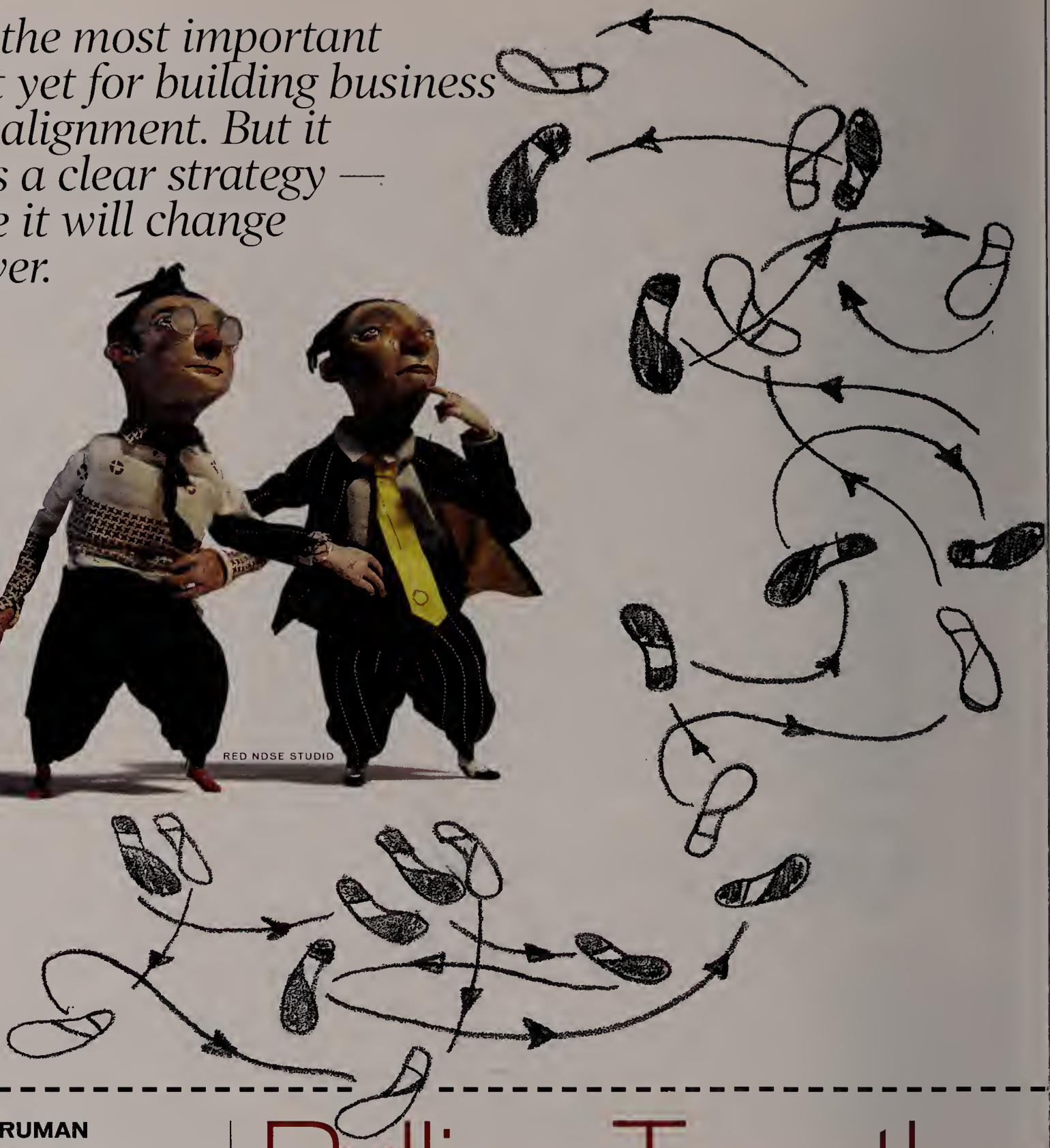
SOA is the most important concept yet for building business and IT alignment. But it requires a clear strategy — because it will change IT forever.



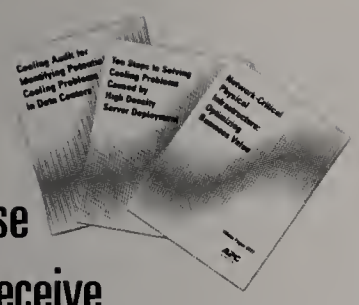
Pulling Together an SOA Strategy

BY GALEN GRUMAN

The concept of service-oriented architecture has gained real steam among CIOs in the past year, promising a way to more quickly build and adapt software functionality to deliver new, more flexible business processes.

A November 2005 Yankee Group Research Inc. survey of 306 U.S. organizations found that all had started or planned to start SOA initiatives within two years. Using an SOA lets you "craft enterprise-like functionality across hundreds of moving parts," says John Halamka, CIO at Care-

CONTINUED ON PAGE 6



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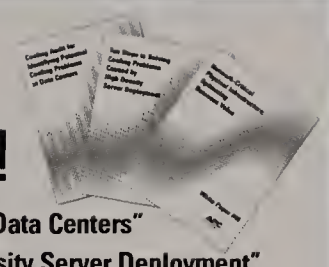

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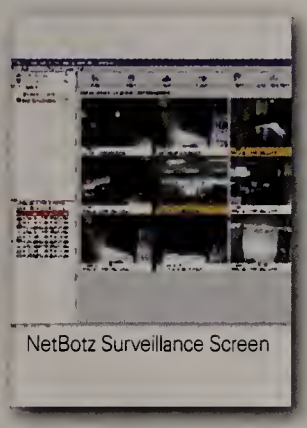

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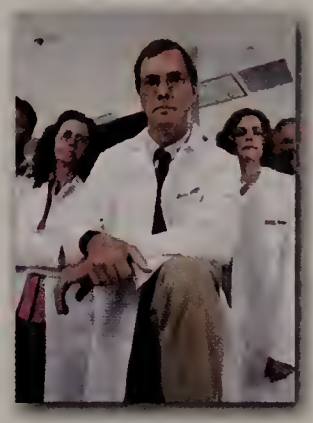

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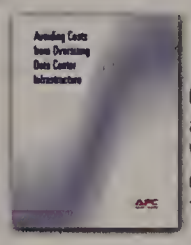

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CONTINUED FROM PAGE 4

Group Healthcare System in Boston.

Properly deployed, SOA puts business processes — rather than software — in the driver's seat. By piecing together functionality and data from almost any application and orchestrating them to help automate a business process, IT can break the boundaries imposed by many mainframe and enterprise applications. The SOA approach also encourages reuse of these services, reducing development efforts over time and ensuring greater consistency across processes.

For example, Boston-based research firm Aberdeen Group Inc. predicts that a fully implemented SOA will reduce development costs by 25%, or about $53 billion over five years, across the 2,000 largest firms worldwide. The Guardian Life Insurance Company of America in New York has seen a 30% drop in such costs, says Jaime Sguerra, chief architect.

But SOA means dramatic change for most IT departments. The skills required include expertise in object-oriented development, business analysis and complex service orchestration. Get busy finding these people: By 2008, 80% of development projects will be based on the SOA model, Gartner Inc. predicted in a March 2005 report.

Though by no means easy, SOA is the most important blueprint yet devised for achieving business and IT alignment. It can help IT move from being just a cost center and technology provider to becoming the key enabler of critical business processes.

Leading Change

A December 2005 Aberdeen Group study of 284 companies shows that CIOs lead SOA efforts 40% of the time. Even though SOA promises clearer business benefits than traditional technology efforts, business managers lead SOA efforts just 18% of the time. CIOs have the advantage of both managing the IT staff that implements the SOA and of being neutral in business-unit turf battles.

"Our real challenge was getting our 76 agencies to share," says Suzanne Peck, chief technology officer of the District of Columbia, which in a five-year SOA effort has collapsed 370 applications into nine sets of cross-agency business services. SOA gives CIOs the strategy they need for bringing speed, flexibility and innovation to business processes.

CHRIS HARTLOVE

> "Our real challenge was getting our 76 agencies to share."
>
> **SUZANNE PECK,**
> CTO, DISTRICT OF COLUMBIA

CIOs routinely hear complaints from business management about how inflexible and costly the IT infrastructure is, and how long it takes to deploy applications. SOA forces IT to understand business issues so it can develop services that address real business requirements. That requires a closer partnership between IT and business staffs, making the business analyst role in IT a key one. SOA forces the business and IT to take a common design and development approach, so it's no surprise that Aberdeen Group's survey showed that half of large companies cite "alignment with the business" as the top factor that drove them to initiate or implement SOA. This factor was closely followed by "managing IT complexity," cited by 49% of large companies.

This tight coupling between IT and business puts the CIO at the nexus between the two groups, in a position that requires deep business understanding and an ability to lead IT efforts that deliver on the business needs. Because services reflect actual business processes, business managers will be able to measure a CIO's effectiveness on aligning IT to business values, something that's difficult to do with traditional IT projects. "It's a

great way to unify the organization," says Scott Metzger, CIO at San Luis Obispo, Calif.-based TrueCredit, a subsidiary of credit reporting agency Trans Union LLC.

But that value may not be apparent right away. SOA requires a retooled IT infrastructure, and the first applications delivered will largely execute existing business processes. But the benefits should soon become apparent, as IT adapts the services more quickly to changing business needs and builds entirely new services.

"The marginal cost for putting on the next Web service is zero," says Guido Sacchi, CIO and executive director of shared services at Atlanta-based CompuCredit Corp.

Not Just a Project

Because SOA is an architecture, not a specific technology or product, CIOs should not promise to deploy "an SOA." Instead, they should promise to deliver business-critical services using the SOA model. A complete SOA effort can take five or more years to deploy. Fortunately, SOA's approach of breaking applications into discrete services means an SOA effort can be incremental, gradually replacing traditional applications.

"It's a long-term journey" to a truly different way of delivering business processes, says Judith Hurwitz, president of Hurwitz & Associates, an IT consultancy in Waltham, Mass.

The SOA approach and its supporting technologies allow greater interplay among existing and new applications but also require a new kind of application development. Services require extra work to create the interface that links the service with others and describes what the service does in business and technical terms and how other systems access it. "A good service knows who it is, can describe itself to others and show who wants to connect to it," says Jeff Gleason, director of IT strategies for the financial markets group at Transamerica Life Insurance and Annuity. "The essence of service-style integration is that the interface is intelligent and communicative."

Creating and deploying services within an SOA also requires a different type of talent. The IT team must include services and data architects, developers who understand object orientation, business analysts, developers familiar with the inner workings of existing systems, experts in distributed systems development and management, and staffers familiar with Web-oriented tools and standards. "It's not easy to find people able to build these types of architectures," warns Sacchi.

And then the CIO needs to ensure that everyone follows the architecture. "SOA isn't a technology; it's a framework, a blueprint, and if you don't have control over it and aren't guaranteeing that it's being applied across the organization, you'll never have a true SOA. There are probably a million ways to architect an integration layer, but you can't have a thousand different ways inside your company," says Rick Sweeney,

Will Vendors Really Do SOA?

Seeing the interest in SOA among their enterprise customers, many vendors are starting to rethink their own applications as a set of services, making them more modular and thus more easily updated incrementally. While some vendors' SOA offerings may involve nothing more than repackaging their existing approaches and relabeling individual suite applications as services, many others see SOA as a way to gain the same benefits for their internal development efforts that their CIO customers are beginning to see.

If software vendors adopt the SOA approach for their own products, they'll be able to more easily modify and add components – and thus deliver incremental services without requiring customers to undertake major upgrades.

The component approach favored in SOA should also help CIOs lower their software acquisition costs. That's because they'll only have to buy the specific services they need, not everything the vendor decides to bundle. It should also reduce vendors' development costs, which should also help reduce prices.

But the SOA approach also adds risk for software vendors: CIOs can invest in internal services or buy third-party services if they find a vendor's product to be deficient or overpriced. That makes it harder for vendors to sell suites with mediocre components. It also gives them an incentive to develop their SOA-based applications in a way that isn't so open and transparent.

Major enterprise application vendors like SAP AG, Oracle Corp. and Microsoft Corp. are developing SOA platforms and reworking their applications for an SOA framework. Each vendor's goal is to make its platform the preferred basis for deploying services, using its own applications as well as third-party services.

"They're all wining and dining the software vendors to foster an ecosystem," says Dennis Gaughan, an analyst at AMR Research Inc. in Boston. All platforms are in early stages of development, but a common approach is to support the vendor's own interface standards to give an advantage to applications written specifically for that system. Software makers may also support industry-standard interfaces so companies can integrate vendor-neutral services from other providers or ones they create themselves.

You should watch vendors carefully to ensure that platforms advertised as SOA-based don't end up as proprietary systems in disguise, says Ronald Schmelzer, an analyst at ZapThink. Gaughan agrees, noting that "vendor self-interest can trump compatibility."

– GALEN GRUMAN

chief architect at Blue Cross and Blue Shield of Massachusetts.

When Shadman Zafar, senior vice president for architecture and e-services at Verizon Communications Inc., began developing a services catalog in 2001, many developers promised to follow the SOA and reuse components — but they didn't. "We had to stop some projects," he recalls. "People learned that they had to reuse the enterprise assets."

Technology Is Young

As promising as SOA is as a concept, the enabling technologies remain immature. So some initial SOA efforts won't scale to handle the number of services that a fully deployed SOA would have in a large enterprise. Because an SOA breaks applications into components that can be mixed and matched in multiple ways, managing those interactions and keeping track of the services and their business and data logic can be difficult.

One challenge caused by this complexity is that of master data management. In an SOA, data can be used by different services, which may or may not understand the data's meaning and context in the same way.

"The more you distribute the data, the more likely it is that there will be problems," says Song Park, director of pricing and availability technology at Starwood Hotels & Resorts Worldwide Inc. The result could be what Don DePalma, president of Common Sense Advisory Inc. in Lowell, Mass., calls "frankendata," which calls into question the accuracy of the results generated by the services and applications. Once you get over the thrill of the first services, you will discover the pain of data management "when you put together your first three- or four-way data service," says DePalma.

"There's always a context to data. Even when a field is blank, different applications impose different assumptions about what that means," says Ronald Schmelzer, an analyst at ZapThink LLC, a Waltham, Mass.-based research firm. The solution is to treat data logic as you would business logic in an SOA: as separate services that don't hide context or assumptions from the business services.

"Think about the processes that affect the master data wherever it lives," advises Henry Morris, an analyst at research firm IDC. For example, the business logic that looks up a customer's order status should rely on a separate data service to match the customer ID across the databases and applications that provide individual results — such as order date, order amount, product description and shipping status — to that business logic.

As IT creates more services, it becomes harder to keep track of which services are available and what each one does. That can lead to the repeated creation of the same services, eliminating the reuse advantage of SOA, as well as threatening the benefit of having common services for common tasks. At the least, you need an architectural review group that looks at proposed services to see if they might already exist or can be adapted from what already exists. At best, the CIO should create a services repository or registry that developers (and business requesters) can access, though the current technology for this is not yet well developed. "We knew at 15 components that we'd need a registry," says Edmund Vazquez, Web services program manager at Sprint Business Services, a unit of Sprint Nextel Corp. Sprint's registry lets business and IT staffers see if a needed service already exists, or if there's a similar one that can be used to develop a new service.

Incremental Approach

The transition to an SOA should be just that, a transition, not a big bang. In the early phases of implementing an SOA, it makes the most sense to choose projects that provide the greatest financial impact and thus generate support for further IT investment to enable the use of more services.

Once you've picked the initial target, it's usually best to focus on related services for the next stage, so the developers can understand their interactions and divide the constituent services appropriately. The next step is to move into different business domains in the same incremental fashion.

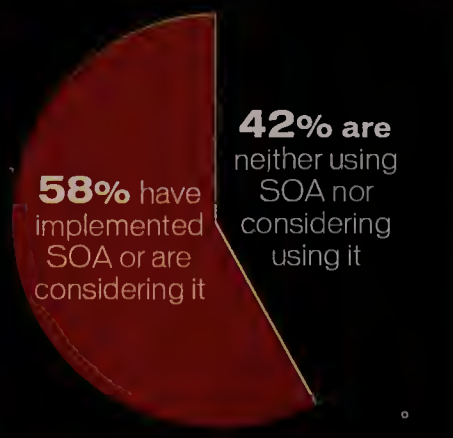
"One of the nice things about SOA adoption is that adoption, implementation and deployments can be incremental as long as you keep your eye on the bigger picture," says Vazquez.

But achieving the promise of SOA requires a firm commitment from the CIO — with support from the rest of the business — to think differently. Otherwise, SOA investments will simply be this decade's IT fad, creating many projects with no lasting impact. If an SOA's focus becomes specific technologies — rather than the architecture — IT has missed the point, says Praveen Sharabu, director of enterprise architecture at Con-Way Transportation Services Inc., a trucking company based in Ann Arbor, Mich. "Companies tend to look for a Holy Grail," he says. "But this is really about building a solid foundation." ◆

Gruman is principal of The Zango Group in San Francisco and a regular contributor to CIO *magazine. Contact him at ggruman@zangogroup.com.*

MEASURED MOVES

More than half of respondents are making the move to SOA:



BASE: 612 IT professionals

SOURCE: COMPUTERWORLD/CIO EXCLUSIVE SURVEY, FEBRUARY 2006

MASTER PLAN

Once implemented, their SOAs will be used for:

Integrating applications internally	44%
Providing services directly to customers or consumers	28%
Connecting with external apps provided by partners	21%
All of the above	53%

BASE: 353 IT professionals; respondents could choose all that apply.

SOURCE: COMPUTERWORLD/CIO EXCLUSIVE SURVEY, FEBRUARY 2006

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The SOA Toolbox

Focus on the functions you need, not what to buy.

RED NOSE STUDIO

BY ROBERT L. SCHEIER

Mike Kronenwetter has big dreams for his service-oriented architecture: He wants it to align his IT efforts more closely with the needs of the business.

But Kronenwetter, vice president of technology management at health insurer Highmark Inc. in Pittsburgh, is building the foundation for that dream step by step. Wherever possible, he wants to build his SOA on newer versions of products he already uses, and he's "working on a lot of our strategies around what it means — what are the governance models we need and what are the pilot projects we should be looking at?"

Analysts say Kronenwetter's approach is the right one. SOA success is determined not by which specific products you buy, but by how well you understand what you need from your SOA and which products pitched as "SOA solutions" meet your needs. This is even more important with SOA than it is when you're

evaluating other new technologies, because SOA is fundamentally not about new technologies, but about new ways to create, manage, share and secure applications. With the right SOA perspective, the systems that companies already use can get them a long way toward their SOA.

An SOA is a radical leap from the conventional model of stand-alone applications consisting of bundles of functions, such as "create customer record" or "create invoice." In an SOA, each of those functions is represented by a "service" available on the network to any application or user who has the authority to use them.

If all goes well, it becomes easier, cheaper and faster to meet new business needs by creating collections of already-available services than it is to keep building new stand-alone applications and to laboriously write interfaces between those applications whenever they need to share data. Early adopters are doing just that, with a mix of new technologies and products already in-house.

Build on What You Have

At Highmark, Kronenwetter didn't set out to buy an enterprise service bus (ESB) that could help him build his SOA, but he is already using IBM's MQ Series messaging software. The latest release of that software, as well as IBM's WebSphere Application Server, could provide the ESB functions Kronenwetter needs as he expands the range of services he deploys.

Many other SOA builders "want to use their existing infrastructure" in the form of existing middleware, as well as application servers running Web applications, says Ronald Schmelzer, an analyst at ZapThink LLC, an IT consultancy in Waltham, Mass.

Kronenwetter chose IBM's WebSphere Business Modeler for upfront service design because it was relatively easy to use, both for business analysts who outline the processes they need to automate and for the systems analysts who use those models to develop actual code. He chose LogicLibrary Inc.'s Logidex metadata repository because of how well it integrated into the WebSphere development environment and how easy it

CHRIS HARTLOVE

> "What are the governance models we need and what are the pilot projects we should be looking at?"
>
> **MIKE KRONENWETTER,** VICE PRESIDENT OF TECHNOLOGY MANAGEMENT, HIGHMARK INC.

BIG DRAWS

THE TOP FIVE factors that influence companies adopting an SOA architecture:

1. Greater degree of business flexibility
2. Lower cost of integrating existing applications
3. Lower cost of developing new applications
4. Less time required to develop new applications
5. Less time required to maintain existing applications

BASE: 353 IT professionals

SOURCE: *COMPUTERWORLD/CID* EXCLUSIVE SURVEY, FEBRUARY 2006

SOA HURDLES

THE TOP FIVE challenges to SOA adoption:

1. Shifting to an SOA architecture and methodology while meeting current business needs
2. Rearchitecting the infrastructure to support SOA
3. Changing developers' methodologies to fit an SOA architecture
4. Determining what an SOA is and how to design one
5. Changing the governance strategy to support SOA

BASE: 353 IT professionals

SOURCE: *COMPUTERWORLD/CID* EXCLUSIVE SURVEY, FEBRUARY 2006

is to search for and use components needed to create services.

Monitoring and management is the last big piece of Kronenwetter's SOA puzzle. For that, he says, "We're an [IBM] Tivoli monitoring shop, and we're looking at how to leverage the monitoring infrastructure we have in place."

David Llamas, IT director at Harrods Ltd. in London, chose Sun Microsystems Inc.'s Java Integration Suite as the foundation for his SOA. His goals were to make it easier for

David Llamas uses Sun's Java Integration Suite.

business users to get a single view of each customer's actions over the company's sales channels and to eliminate reliance on internal developers to create and modify interfaces among applications that needed to share data.

Llamas chose the Sun suite because its master data management capabilities make it easier to create and maintain single customer views across multiple systems. It also makes it easy to modify the Java code underlying his services as business conditions change.

Unicco Service Co., a facilities management company in Auburndale, Mass., has written about 20 services using the Bowstreet Portlet Factory from Tewksbury, Mass.-based Bowstreet Inc., which was acquired by IBM in December 2005. Unicco has

The SOA Bleeding Edge

Something as radically different as an SOA requires radically new products. Two companies are taking that gamble with unusual approaches to creating and running services.

Webalo Inc. in Santa Monica, Calif., aims to make it easier for end users to control the look and feel of data presented to them in an SOA by representing the service consumer (which could be a person or a device, such as a BlackBerry) as just another service within the SOA.

Most SOA tools, says Webalo co-founder and Chief Technology Officer Seth Bruder, focus on "abstracting" service providers (such as applications or databases) and making their information available as a service over the network. But on the receiving end, developers have to create complex software to present that information in a form usable for the receiving device, such as a handheld.

The Webalo User Proxy "allows a business consumer and user to drive content and presentation and interface with those back-end systems" in a more natural way, says Bruder. The proxy will first see the light of day through a partnership with IBM, which last month was scheduled to roll it out in an IBM-branded service called the Mobile Dashboard for transmitting critical business information to mobile users.

While it's too soon to say how successful Webalo will be, the company is right to focus on the "consumer" side of the services equation, says Jason Bloomberg, an analyst at ZapThink. Such a user proxy will eliminate the work of writing separate translation software for each device. As more companies figure out how to produce services, he predicts, "more and more of the focus is going to be on the consumer side, whether it's multiple form factors or other sort of rich-client capabilities or consumer-centric [issues]."

Bilal Khokhar, development manager for field applications at Unicco, says he would definitely be interested in such a proxy to help him develop his own services-enabled dashboard, which would draw data from multiple corporate databases to give top managers an instant overview of business performance.

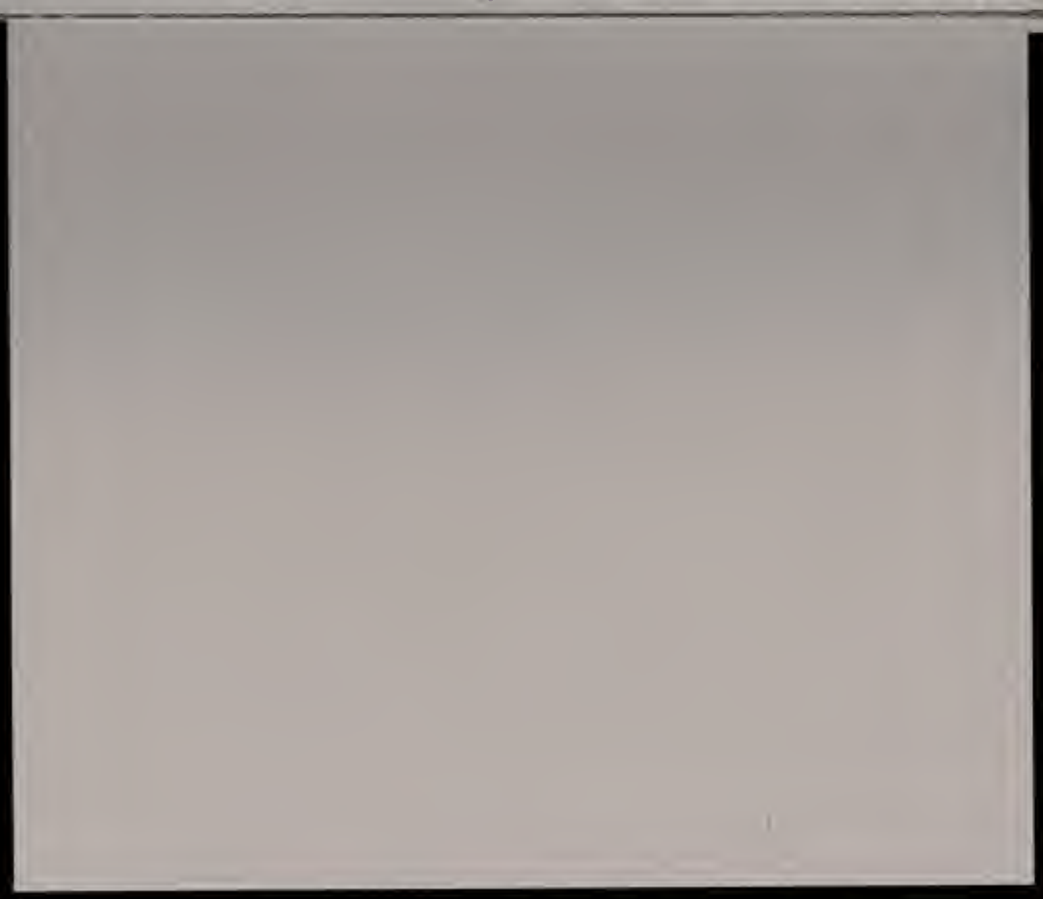
If Webalo is "abstracting" users, then **Azul Systems Inc.** in Mountain View, Calif., is abstracting processing power with network-attached processing appliances that make compute power instantly available to any service that needs it, says Vice President and Chief Marketing Officer Shahin Khan.

Azul's CentriCore appliance has another advantage for SOA, says Khan: It's designed to run the virtual machines that are the executable components of services. The appliance uses a combination of software techniques and hardware-assisted features to perform garbage collection (freeing up memory no longer needed by applications) without pausing the applications. This allows the virtual machines to get the full performance boost of the hundreds of processor cores in a CentriCore appliance. It also includes specialized hardware for managing multiple application threads so they, too, can exploit the appliance's multiple cores, he says.

Khan declines to say how many of the appliances the company has sold since they went on sale last June. They cost approximately $1,000 per core, making a typical 96-way system "on the order of $90,000, with a healthy amount of memory," he says.

This very dense, on-demand processing could be attractive for companies that want to create capacity for the unpredictable demands of an SOA without having to keep conventional servers on standby, says Vernon Turner, an analyst at research firm IDC. "The Azul box is based on a very dense, multicore [architecture] built into a very small form factor," he says. While mainstream blade servers can run two- to four-processor cores in a single processor socket, Azul runs 16 per socket, says Turner.

– ROBERT L. SCHEIER



no real SOA yet, says Bilal Khokhar, development manager for field applications. But as he prepares to combine services in an "executive dashboard" of critical business information, he says he'll look for ESB-like functions, such as fault tolerance and guaranteed message delivery.

Building Blocks

Different combinations of the functions you need are provided by a sometimes baffling array of products.

A **registry/repository** takes care of tracking and managing services and their components. This functionality is needed to ensure that only approved services can run and that services can be updated as needed. In some cases, it helps control which users or applications can access certain services.

A registry is usually responsible for the service components needed at runtime, whereas a repository is more of a historic library of components originally used to create the services.

Some products handle both types of data and provide sophisticated search capabilities for everything from models used in development to operational reports about the SOA. Some also store security-related information, such as user access rules.

Features to look for, say analysts, include support for standards such as the Universal Description, Discovery and Integration standard, ease of use and application programming interfaces to support key functions such as the ability to subscribe to changes or access the registry.

The **modeling** function allows business users and systems analysts to define the business processes the service will enable. Based on the process diagram, the modeling tool exports code that can be imported into other design tools or into application servers.

Key features include ease of use, support for key SOA standards and whether the code produced by the modeler fits your development environment. Some customers even use diagramming tools for modeling.

The **management and security** function can involve monitoring and managing the SOA messaging infrastructure, the services themselves and even business information, such as whether key transactions have been completed. These functions might be carried out by stand-alone applications, other SOA tools, such as ESBs or messaging middleware, and even dedicated security appliances, such as XML gateways.

STILL EVOLVING

Respondents rated the maturity and capability of the following SOA technologies:

	Mature	Still evolving	Inadequate
Development tools	16%	79%	5%
Enterprise service bus	16%	73%	12%
Repository/registry	14%	72%	15%
Monitoring and management	12%	66%	22%
Security	14%	65%	22%
Migration/legacy adapter tools	10%	68%	22%
Underlying protocols	25%	68%	8%

BASE: 353 IT professionals. Percentages may not add up to 100 because of rounding.

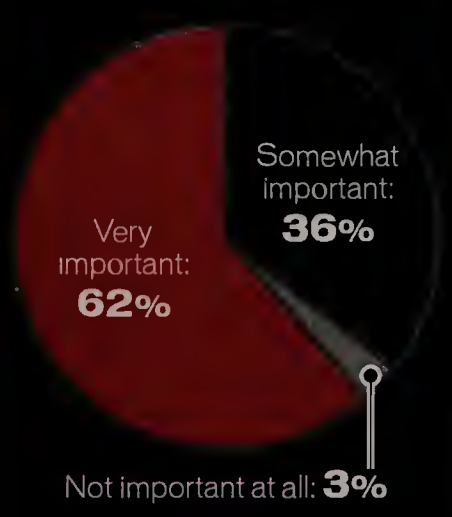
SOURCE: *COMPUTERWORLD/CIO* EXCLUSIVE SURVEY, FEBRUARY 2006

Usually described as a common platform over which services communicate at runtime as they share messages or data, an **ESB** can mediate or translate among the various data and messaging protocols used by the underlying applications represented by the services.

Some products are more specialized. Sonic Software Corp., part of Progress Software Corp. in Bedford, Mass., sells an XML server to speed XML processing. It also offers the Sonic Collaboration Server, which extends the capabilities of Sonic's ESB so it can integrate with the systems of external business partners.

STANDARDS ARE KEY

The importance of support for key SOA protocols and standards when choosing which products to buy:



BASE: 353 IT professionals. Percentages do not add up to 100 because of rounding.

SOURCE: *COMPUTERWORLD/CIO* EXCLUSIVE SURVEY, FEBRUARY 2006

CentraSite, a repository developed by Fujitsu Ltd. and Software AG, stores and manages data from SOA integration products such as Fujitsu's Interstage Business Process Manager and Software AG's Enterprise Service Integrator and Enterprise Information Integrator.

There's also a "sizable market" for software that allows data and business rules on mainframes to be presented as services, says Schmelzer.

Microsoft Corp. plans to provide an SOA messaging platform with the Windows Communication Foundation, which is scheduled for release this year as part of Windows Vista.

With such a fast-changing and hard-to-define tool set, some analysts argue that it's best to begin building services with the tools you need now and look for other SOA functions as you need them.

"If I architect around 'my platform is such and such,' I've got no sustainability, no flexibility," says Randy Heffner, an analyst at Forrester Research Inc. "If I get a different product with a different scope of capabilities, I've got to redraw my architecture, and I don't want to do that." ◆

Scheier is a freelance writer in Boylston, Mass. You can contact him at rscheier@charter.net.

OPINION

An **SOA** State Of Mind

ROBBIE McCLARAN

Service-oriented architecture is not the next "rapid prototyping," "extreme programming" or other trendy IT development technique. Done right, it's a state of mind for your entire business.

And it's one that's catching on fast. So you'd better get cracking, because your company's competitors are already embracing the SOA mind-set.

Aberdeen Group surveyed 284 Global 2,000 companies and learned that 68% were engaged in SOA projects in 2005. By 2007, that figure will skyrocket to 98%. It's easy to see why. Big companies expect to save as much as $53 billion between 2006 and 2010 simply by applying SOA principles to application development and deployment. Most of the savings will come from being able to reuse fully tested and proven code.

Since everyone will get their share of SOA's inherent operational savings, becoming an SOA shop won't give you a unique competitive advantage. The critical part of adopting it will be in *how* you implement SOA to create business opportunities.

Think of SOA like PCs in the 1980s. You knew PCs would be ubiquitous inside your company as well as within your competitors' businesses. Going with SOA, like adopting PCs, is a no-brainer. As I said, it's how you do it that takes a little gray matter.

When PCs first arrived, most IT execs were happy to let users buy them and share information via sneakernet — passing 5 ¼-in. floppy disks around the office. But true IT leaders quickly pushed their companies toward networked PCs with mobile capabilities running distributed applications that added business value throughout their organization.

The same will be true for SOA. It won't be enough that you litter your code with SOAP envelopes and memorize your industry's XML vocabulary. You'll need to build an SOA infrastructure that makes it possible for end users to exploit the technology.

How will you do that?

For starters, don't think of the software components as part of the IT department's arsenal. Make them part of your company's business weaponry. Push component access, detailed descriptions and usage examples out to end users. Give them easy-to-use tools that show them how to combine, compile and, yes, deploy their own homegrown applications just as users built and shared their own Excel macros.

But there's a big difference. When end users created value with Excel, for example, IT surrendered part of its leadership to Microsoft. In that case, end users knew it was Bill Gates & Co. that gave them the capability to do new things for the business, not you. With SOA, however, you can foster an environment to liberate end users from getting into an IT application-development queue. One approach is to create an SOA SWAT team and make it available to assist end users struggling with component programming and to test end users' final code.

Sure, SOA is an opportunity to save big IT operation dollars. But more important, it's a chance to let end users create major business value while enhancing IT's reputation. ◆

BY MARK HALL

Hall is editor at large and a columnist at Computerworld. *You can contact him at mark_hall@computerworld.com.*

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Visit www.cioexecutivecouncil.com/it_value to learn more.

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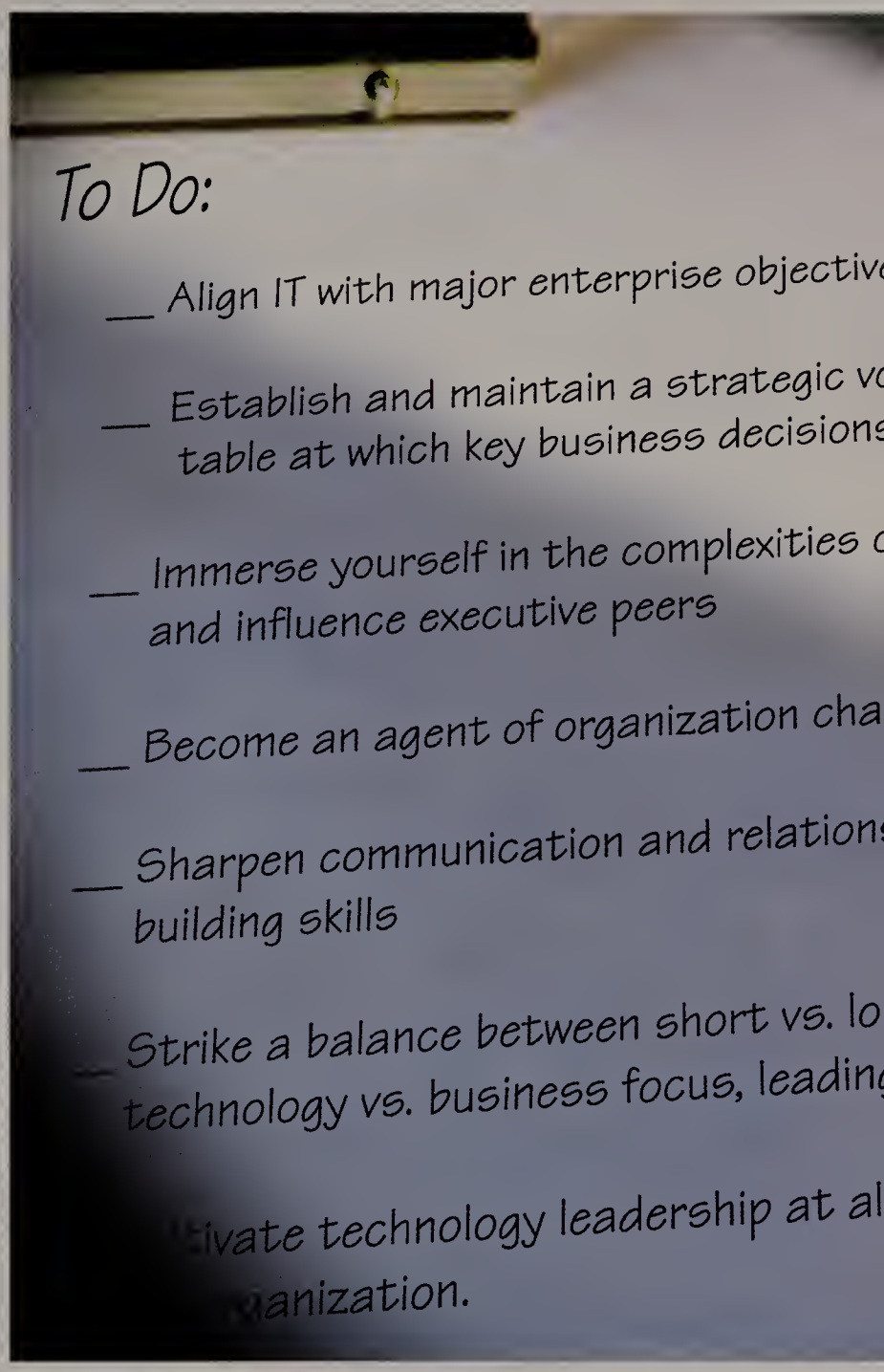

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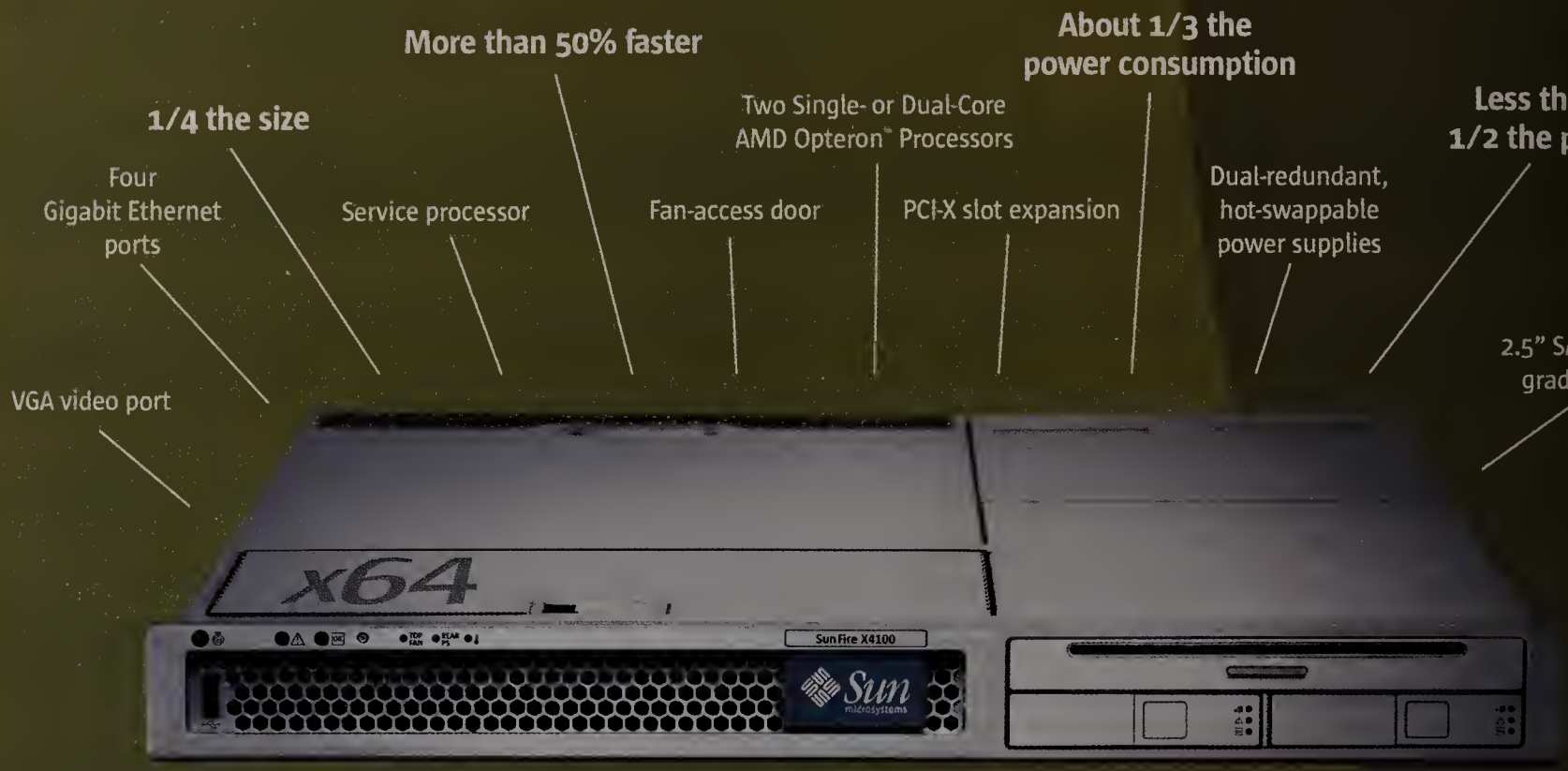

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Look Back for Keys to Vendors' Future

I.T. COMPANIES This year marks a decade since the Internet bubble started inflating. Today, with IT spending on the rise again, "we're entering a new 10-year period that I suspect will wind up being even more important than the bubble was," observes Mark Stahlman, managing director of equity research with Caris & Co.

IT industry analysts believe the dominant vendors then—such as IBM, Microsoft and Cisco—sowed the seeds for how they would fare in the future in they ways they responded to the dotcom boom and bust.

IBM, observes Stahlman, has been resilient. Ten years ago, as it was being outpaced by other companies as a technology innovator, it sought refuge in the services market. After the bubble burst, IBM was able to capitalize on CIOs' need to cut costs by outsourcing. Now that IT spending is picking up again, the company is reemerging as a technology maker, with an emphasis on high-end servers, mainframes and semiconductors. Meanwhile, it is repurposing services as boosters to its hardware and software sales.

Microsoft's overreaction to the Netscape threat landed it in antitrust court and caused it much damage, says industry analyst Rob Enderle of Enderle Group. On the other hand, Enderle says, Microsoft succeeded at building a credible suite of server software, which it lacked in 1995, enabling the company to become "solidly entrenched in the back office."

Today, the company faces another challenge: the need to reinvent itself for the new wave of software as a service, says Amy Wohl, president of Wohl Associates. Google is a particular threat because it can use its dominance in search engines to offer Web-based software as a service to consumers and enterprises, she says.

Cisco opted to grow through acquisitions and alliances, broadening its scope in networking and later entering new markets, says Frank Dzubeck, president of Communications Network Architects. But now, Cisco plays in so many markets—networking, voice over IP, security, storage and services—that it risks clashing with IBM, Microsoft and other partners in the marketplace. *–Juan Carlos Peréz*

Why a CIO Makes a Good Business Strategist

ON THE MOVE As CIO of UniGroup, the transportation company that operates Mayflower Transit and United Van Lines, Randall Poppell spent a lot of time doing strategic planning for the company as part of his effort to create an IT strategy. The IT strategy meetings Poppell held always involved discussions about the business strategy, business processes and business transformation.

Last fall, Poppell, 48, was rewarded for these efforts when he was named UniGroup's vice president of strategic planning. He's the first person in his company to hold the title.

He is also among three CIOs in the past year to move into the role of chief strategist. First was Marv Adams, Ford's senior vice president and CIO who was given the added role of strategy chief last May. Then in January, Bed Bath & Beyond CIO Richard McMahon was appointed his company's chief strategy officer and vice president of corporate operations.

Poppell, who remains UniGroup's CIO, says he didn't explicitly prepare himself for his new role. However, he believes that his creation of an IT strategy and successful execution of his company's first major IT project in years demonstrated to his boss the ability "to create an end-state picture, put all the tactical pieces in place, and drive all the initiatives to successfully get to that end-state picture."

When he's not tied up with his CIO responsibilities, Poppell works closely with the CEO and board of directors to develop the company's long-term business plans. He also guides the business unit heads through scenario planning exercises to help them envision what their businesses might look like in three years as well as to identify opportunities and threats. He says his new role forces him to think more broadly about the company, his industry and macroeconomic forces.

Randall Poppell, CIO, UniGroup

As Poppell ponders his company's future, more may very well be in store for Poppell at UniGroup. When asked if he thought his promotion might be part of his company's succession planning process, he answered, "The thought has certainly crossed my mind." *–Meridith Levinson*

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AN EARTHQUAKE EARLY **WARNING** SYSTEM

SENSORS Researchers in Japan, one of the world's most earthquake-prone countries, have developed a network that can provide several seconds' warning that violent seismic shaking is about to commence.

The network, coordinated by the Japan Meteorological Agency (JMA), is expected to go into full operation later this year. It could provide anything from a few seconds' to a minute's warning of a major earthquake—long enough to bring trains to a halt, cut off gas supplies or stop factory production lines. How much warning people have will depend on how far they are from the earthquake; locations nearer the epicenter, which are likely to be shaken the most, will get the least warning. But researchers agree that any warning is better than none.

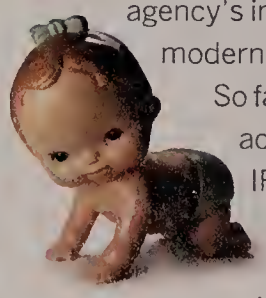
Earthquakes generate two main types of waves, called primary waves (P-waves) and secondary waves (S-waves). The P-waves travel at about twice the speed of the S-waves and are typically weaker. But by quickly detecting, measuring and analyzing the P-waves using a network of sensors, researchers can estimate the earthquake's source and strength. This data can help researchers predict when the potentially destructive S-waves will be felt and how strong they will be. The data can then be used to deliver electronic warnings to offices, factories or people's homes.

The JMA maintains a network of about 200 earthquake monitoring stations across Japan that collect the sensor data. Several companies have developed systems for homes and offices that use the JMA's data to generate warnings and distribute them via the Internet. One of the simplest comes from Tecs, which developed software that can be installed inside some Canon photocopiers. The software uses the copier's network connection to maintain an Internet link with a server containing data from the JMA. When an earthquake is about to occur, the software can sound an alarm and also flash warnings on PCs connected to the office network, so long as they have a companion software application installed, says Shouji Nihei, a Tecs employee.

–Martyn Williams

Baby Steps for IRS Upgrades

GOVERNMENT As tax day approaches, IRS CIO Todd Grams says returns are beginning to come in on the agency's investments in an $8 billion modern IT infrastructure.



So far, the gains are small, Grams acknowledges. For example, the IRS will process only 4 million out of more than 200 million individual returns through its Customer Account Data Engine (CADE), a central database of tax information that will eventually replace the 1960s-era master file of taxpayer records. Then again, says Grams, it's the pursuit of small victories that has enabled the agency to begin turning around its troubled modernization program. "We cut back to where we could manage projects in more bite-size pieces," Grams says.

Grams asked for and received a 37 percent cut in the budget for new systems last year. He put on hold an internal accounting system because it had less impact on the efficiency and accuracy of the agency's work than other projects. (For a humorous take on IRS IT, see "Endlines," Page 76.)

Instead, the agency focused on making improvements to CADE, as well as an electronic filing program for corporate tax returns. In 2005, CADE processed only the simplest returns: 1.4 million 1040EZ forms that were filed electronically. This year, the agency is also accepting the more popular 1040 and 1040A forms from taxpayers with no dependents and no schedules of deductions or investment income.

The agency applied the same baby-step approach to electronic filing of corporate tax returns, mandating it this year for about 11,000 companies with assets of $50 million or more as well as about 1,000 tax-exempt organizations with assets of $100 million or more. Electronic filing makes it easier to process returns, to track irregularities and to conduct audits, which now take five years to complete.

So far, Grams' approach is getting mixed reviews. The Government Accountability Office agrees the IRS is making progress but notes that the most risky elements of the modernization effort—deployment of systems for processing the majority of tax returns—remains to be completed.

–Allan Holmes

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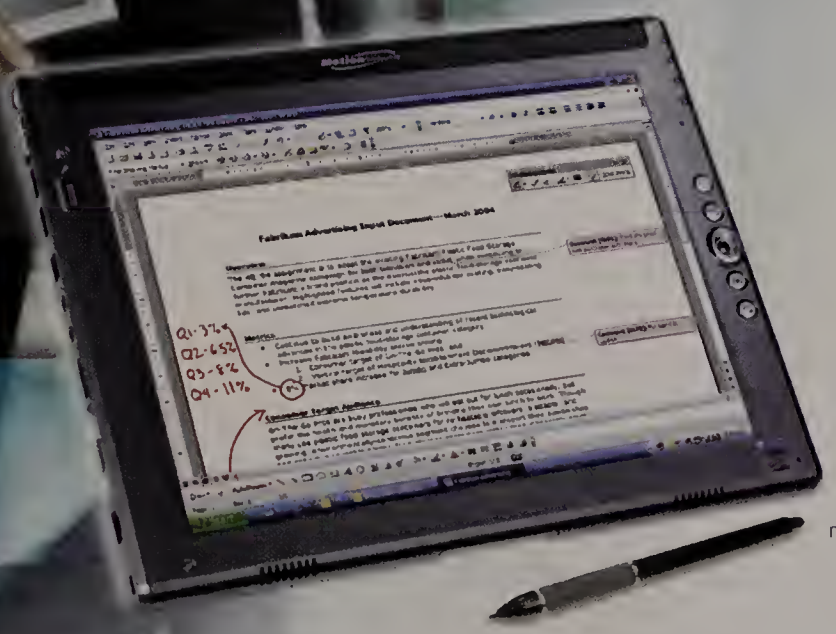

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technology

Edited by Christopher Lindquist
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The Name Game

Tagging tools let users describe the world in their own terms as taxonomies become "folksonomies"

BY MICHAEL FITZGERALD

SEARCH | Tagging offers a potentially powerful way for a company to organize information by making fresh content immediately searchable, letting users designate terms that make sense to them and providing users with a sense of ownership. This ability for tags to provide so much content-describing power for ordinary folks has given rise to the term "folksonomy," as opposed to the more restrictive sounding "taxonomy."

But like taxonomies, tags are all about finding data. "It's another tool in the toolbox" for CIOs, says information architect Louis Rosenfeld. Rosenfeld notes that companies typically organize meta-data around attributes and values. Taxonomies often handle attributes well; a corporate library, for instance, can be organized quite well around book titles and authors. But if you want to search on a value—a book's topic, say—things get harder. Searching through nontext, such as video, can also be a challenge.

Given their information density, Rosenfeld thinks intranets will be a prime testing ground for tagging at the corporate level. One company that has seen encouraging results using tags is IBM. "Tagging makes it easier for you to go back and find something," says Maria Arbusto, IBM's director for user experience who is responsible for how IBM presents its internal information, websites and applications to employees.

ILLUSTRATION BY ANASTASIA VASILAKIS

Arbusto says IBM is "still in the early days" of using the terms employees provide to improve discoverability. She says it has worked well in a pilot involving ThinkPlace, the intranet application IBM uses as an internal suggestion box for ideas the company should consider commercializing or developing and deploying to employees. In the system, employees can comment on the ideas and rate whether they should be pursued.

ThinkPlace originally classified ideas using terms from IBM's official taxonomies for content such as industry and products. But "we observed the users and saw that the terms they used didn't always match" the formal taxonomy, she says. So IBM created a way for users to enter keywords, or tags, that would be appended to the suggested terms from the formal taxonomy and thereby improve their ability to find relevant ideas. The results have been promising, says Arbusto. "You can see what your colleagues are interested in," she says. "From a collaboration and knowledge-sharing perspective, that's what's neat about folksonomies."

Tags are synonymous with the keywords familiar to anyone who has done a search either on the Internet or in a corporate content management system. Indeed, many current applications come with tagging tools that let users append descriptive terms to their documents. (The upcoming Microsoft Vista operating system will even include tagging as a part of its file system.) Another valuable element of tagging is that it works with any kind of file, including video or audio. Users can simply add descriptive terms such as "exterior," "building," "blue," "quiet" and so on. This flexibility makes tagging "a very pragmatic technology"—simple to understand and use, says Andrew Jaquith, a Yankee Group analyst. No taxonomy can come up with every term employees might have for something. But with tagging, users gain the flexibility to work outside the taxonomy.

Thomas Vander Wal, who coined the term folksonomy and is founder and senior consultant for InfoCloud Solutions, says he thinks that in the next couple of years, companies will adopt tagging widely. "Having a folksonomy means you can use people to fill in the gaps in a taxonomy and track emergent vocabularies," he notes.

Tagging for Dollars

Such flexibility is what is likely to make tagging useful to companies, says David Weinberger, a research fellow at Harvard Law School's Berkman Center for Internet & Society. "It's so easy, so cheap, and the benefits are immediate," he says.

> No taxonomy can come up with every term employees might have for something. But with tagging, users gain the flexibility to work outside the taxonomy.

Tagging is already spreading quickly through the Web. The initial ideas are fairly old—the Bitzi online tagging tool (*www.bitzi.com*) has been around since the year 2000—but tagging as a phenomenon didn't start until mid-2004, with the rise of sites such as Flickr, where users upload and tag photographs, and Del.icio.us, where people tag webpages. (Both Del.icio.us and Flickr were acquired by Yahoo in 2005.) Such sites have already shown that tags can be effective even if only small percentages of users adopt them. In fact, Caterina Fake, cofounder of Flickr and now director of technology development at Yahoo, says that a typical group probably needs fewer than 15 percent of its members tagging something for the tags to be useful in helping all members find things, and that number could be as low as 1 percent or 2 percent, depending on the size of the group.

Mis-Tagged

Despite the amount of hype surrounding tagging, it pays to remember that it is still in its very early stages. "We're in the voyeurism phase here," says Greg Blonder, a venture capitalist at Morgenthaler Ventures. And he doesn't believe all the early tagging leaders will stick around (he tags things like Flickr and Del.icio.us as "fads").

But Blonder does think tagging is useful. Morgenthaler has even invested in a com-

Artistic Tagging

Outside corporate intranets, tagging can be used to let consumers define the things they see. A prime example is the Art Museum Community Cataloging Project (*www.steve.museum*), an effort by eight art museums (including the Guggenheim, the Minneapolis Institute of Arts, the San Francisco Museum of Modern Art and the Metropolitan Museum of Art) to identify ways in which tags could be used to help their visitors find pieces.

"There is no way that you would or could have museum professionals—academics, art historians—sit down and look at every work of art and come up with every way you could possibly describe [them]," says Len Steinbach, CIO at the Cleveland Museum of Art, which is also involved in the project. Steinbach says the issue compounds when museum visitors come looking for something they remember seeing before. While the visitor might remember a painting because of an element within it (a brick building, for example), that same detail might be unremarkable to an expert.

Steinbach says his museum hopes the tags will make its collections more useful to teachers. "Wouldn't it be neat if teachers of science could find all the drawings and paintings that had the moon in it?" he says.

–M.F.

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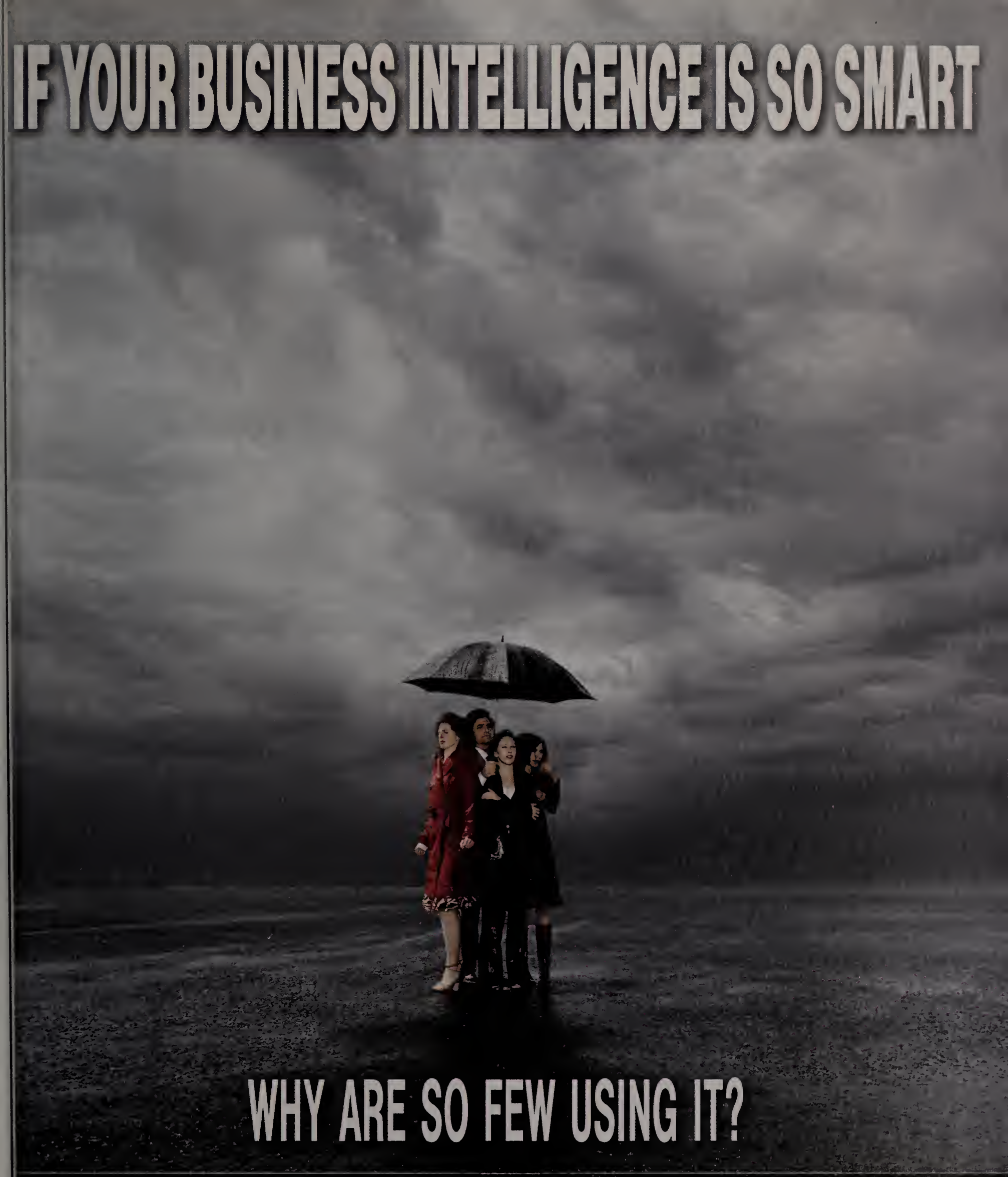

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pany called Digital Railroad, which takes advantage of already-defined tags used in commercial photography to help photographers sell their images.

Tagging is also young enough that serious disagreements still exist within the tagging community about something so basic as how to use it. For instance, should museums let people tag a painting "beagle" if it in fact depicts a dalmatian?

On a more practical level, "Tags really don't fit well with the way corporations tend to organize information," notes Jaquith. "Organizations like file folders, nested hierarchies and those ways of classifying things." But, he says, few companies do a good job of organizing information in this way, and some may find tags offer a more commonsense approach.

Can You Tag Your Enterprise?

No one sees companies abandoning workflow tools, however, in favor of tagging alone. For one thing, most current tagging tools are not available commercially—though there is interest. Chris Fralic, vice president of business development at Del.icio.us, says that a number of companies had contacted the company before it was purchased by Yahoo, looking for a corporate version of its tagging tools.

Yahoo offers Del.icio.us and Flickr and has some beta offerings in the works, and Del.icio.us has inspired other things that might help CIOs. For instance, Jonathan Feinberg, an advisory software engineer at IBM, saw Del.icio.us and decided he wanted a version for the host of bookmarks he has on IBM's intranet, so he built a program he calls Dogear.

It functioned so well that IBM's CIO Bob Greenberg designated Dogear as part of the company's Technology Adoption Program, which IBM uses to help it leverage good ideas from research. Dogear was opened for use across IBM in November, and a mere 1,235 of IBM's 329,000 employees have logged in to the tool more than once.

But Feinberg and his manager, David Millen, an IBM Research scientist, have already refined Dogear, giving it privacy designations (for instance, for those bookmarks people want to keep to themselves). And they've added Really Simple Syndication to let people know when content has been "dogeared." What the company doesn't know is how many users you need to make Dogear worthwhile. That will become clearer in 2006, says Millen, as several IBM customers are expected to try Dogear.

No matter the company's size, there will be management issues. Yahoo's Fake says the tendency within a company is to think that social software is driven by users and thus self-managing, but this is often not the case. "Somebody needs to take responsibility for [the systems], and that's something companies don't understand," Fake says. "They need a community manager."

Fake says all sorts of companies will find that tagging helps them define their actual culture. She talks about the value of the "cool lamp" test—if you type "cool lamp" into Google, the first thing that comes up is a lava lamp, which to her is decidedly uncool. But in a group she's involved with on the tag-driven site Yahoo MyWeb, typing in "cool lamp" generated results that she thought were very cool indeed. Similar technology could prove very valuable in corporations, for instance, where people in research and others in sales might have very different opinions about, say, what kinds of "product details" are interesting, with one group concerned more about material lists and manufacturing constraints and the other interested in profit margins and sales incentives. Companies could also test product concepts by letting users tag them and see what terms they use.

Whether tagging is a poor man's database search tool, a quick-and-dirty search tool on an intranet or an inherent, ground-up part of corporate collaboration doesn't really matter. What does matter is that users do most of the work, and both they and their corporations get the benefit. CIO

Registered users on tag-based photo site Flickr have risen from **1.7M** in 2004 to over **2M** in December 2005.

SOURCE: Nielsen/NetRatings

Serious disagreements still exist within the tagging community about something so basic as how to use it.

Keep Up Online

Technology Editor Christopher Lindquist scours the **best of what's on the Web** when it comes to emerging technology. Read his blog, **TECH LINKLETTER**, at **blogs.cio.com**.

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Michael Fitzgerald (*mike@mffitzgerald.com*) is a freelance writer based in Massachusetts.

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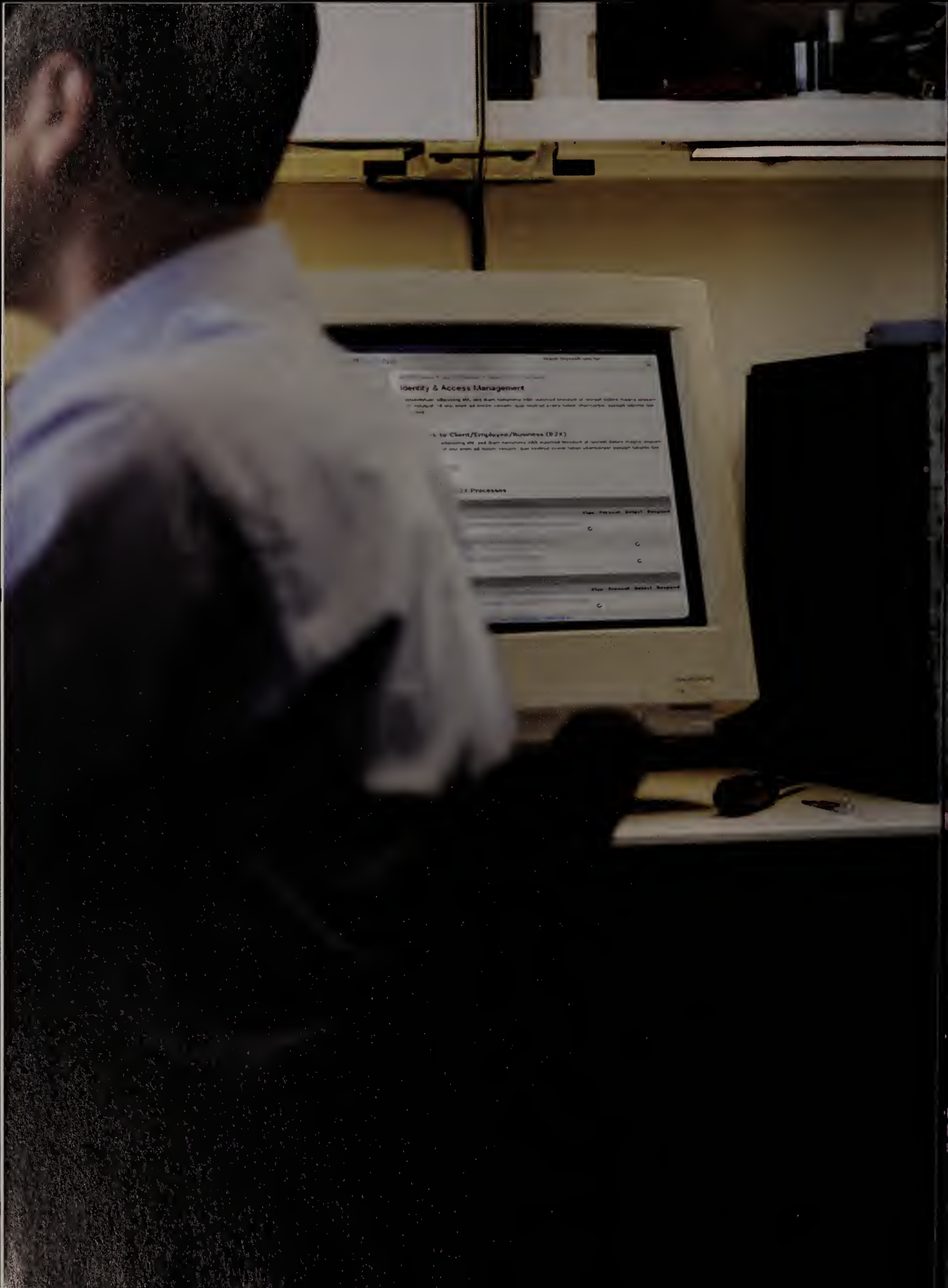
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Martha Heller | CAREER COUNSEL

So You Want to Get Into "the Business"?

Some practical advice for moving out of the CIO role

While the dichotomy between IT and "the business" should be archaic by now, it is alive and well at the executive table. Despite this bias, a growing number of CIOs are moving from the head IT spot into operations, marketing and other roles that rank as bona fide business leadership. Here are four ways to cross the great divide.

1. Move into operations. More than any other executive, CIOs know the nuts and bolts of a company, which makes operations the perfect pathway into the business. When Mike Palmer, now CIO and executive vice president of supply chain management at Allied Office Products, came to Allied in 1998, he was viewed as "strictly an IT guy, with my hands in the network, the hardware and the software," he says. To shake off that image, he became "a good translator, taking the black magic out of IT," through patient and open communication with the line-of-business executives. In 2003, Palmer saw the opportunity to formalize this translator role. "Our company had developed silos around customer service, IT, sales and the warehouse; one team didn't know what the other was doing," says Palmer. "So I came up with the sell for why all of the silos should report to me, put it into a PowerPoint presentation, got my CEO on board and got the job."

2. Take on strategic planning. Jeff Chasney was hired as a turnaround CIO for CKE Restaurants in April 2000. He completed the job in roughly one year, so his CEO handed him a messy accounting department to straighten out. After he spent several months turning around that department, his CEO asked him what he wanted to do next. "As CIO I have the advantage of knowing how all of the company's pieces fit

ILLUSTRATION BY LARRY JONES/THEISPOT

together," says Chasney. "I am well-positioned to help plan where this company is going rather than having to fix the problems that come from a lack of planning." In 2002, he added executive vice president of strategic planning to his CIO title. He has found it to be an excellent match with his CIO skills. "CIOs are spatial thinkers and masters at design, analysis and getting the big picture," says Chasney. "Those are the skills you need in strategic planning."

3. Become a sales leader. In January 2003, Tim Wright became CIO and CTO of Geac, a Canadian enterprise software company. From day one, he had a plan: help the company improve sales, which would allow the board of directors to see the CIO role as something other than G&A. "The sales organization had no way of capturing sales activity, so the business leaders had a hard time forecasting; it was a highly visible problem," says Wright. "I told them that I would solve their pipeline

"As CIO, I am well-positioned to help plan where this company is going rather than having to fix the problems that come from a lack of planning."

–JEFF CHASNEY, CIO AND EXECUTIVE VP OF STRATEGIC PLANNING, CKE RESTAURANTS

and forecasting challenges. I let them know that I would own the problem." He contracted with Salesforce.com for a CRM solution and offered to accompany the sales team when they wanted an executive presence on a call. "When the chief executive of our international operations left in 2004, I was the lead candidate," says Wright, who in May 2004 was promoted to chief executive of Geac's Asia-Pacific, Europe and Middle East operations, while keeping his CTO title. "There were dissenters on the board who argued that I had never had a sales role, but the CEO pointed to Salesforce.com and the accounts I had helped to close. In the end, I won the vote."

4. Create a new business role. John Boushy, chief integration officer at Harrah's Entertainment, started in IT at the company, then moved into marketing, rising to an executive position before coming back to IT as CIO in 1995. He named a CIO successor in 2002 and took on the role of leading Harrah's acquisition of Caesars Entertainment. So what advice can Boushy offer from his experience on both sides of the IT-business divide? "Draw a Venn diagram with IT in one circle and your company's most critical business function in the other," he says. "Look at the overlap and consider what role you can play." If the role doesn't exist, then create it. Find a sponsor who now sees you in that business role, create a new position and raise your hand to fill it.

The Last Word

Martha Heller responds to reader comments

Thanks to all who posted responses to the online version of this column. Several readers questioned the basic premise of the article: Why is moving out of IT and into "the business" a good thing? Here is a sampling of the comments:

"My perspective is that we are all businesspeople; we just bring different skills to the table," wrote Brent Stahlheber, executive VP and CIO of The Auto Club Group (AAA). "Stating what we can do to move from our technology position assumes that we do not have a critical role in leading business change." Or as Arun Gupta, an IT exec at Pfizer India, commented, "Do we have stories of other functions aspiring to the CIO shoes? Are we negating the value the CIO brings to the organization?"

Soon after I read these comments, I was talking with Tom McLain, VP of IT for Old Mutual Asset Management in Boston. He has recently added operations to his purview. I asked him why. "Operations gives me a different perspective of the organization," McLain says. "I learn new skills and I get to diversify my responsibilities from the tactical intensity of leading IT."

New skills and less stress. These sound like solid reasons to make a move. But I suspect there is another factor driving CIOs out of IT: Moving into the business validates your existence as a businessperson delivering real value to your company. So what will it take to raise IT out of its second-class status?

Emmanuel Ramos, a former CIO, says that as long as the phrase "IT *and* the business" exists in corporate parlance, the dichotomy and hierarchy will persist. So he has focused on rebranding. "We need to start thinking of ourselves as businesspeople who happen to deal with a technology function rather than the other way around," he wrote. "In my previous CIO posts, I have strived to brand the technology group as the 'Business Technology' group rather than IT in order to educate my peers about [our role] in the business."

Try a little branding experiment of your own. Identify some linguistic instances that distance IT from the business and jettison them from the language of your company. Re-title a technical position or two, rebrand an IT project, rename your IT organization. Deploy the changes into corporate-speak and see how they influence the perception of IT's business function. CIO

Martha Heller is the managing director of the IT Leadership Practice at the Z Resource Group, an executive recruiting firm based in Boston. She can be reached at *mheller@zrgroup.com*.

Robert Charette KEYNOTE

What Happened to Do No Harm?

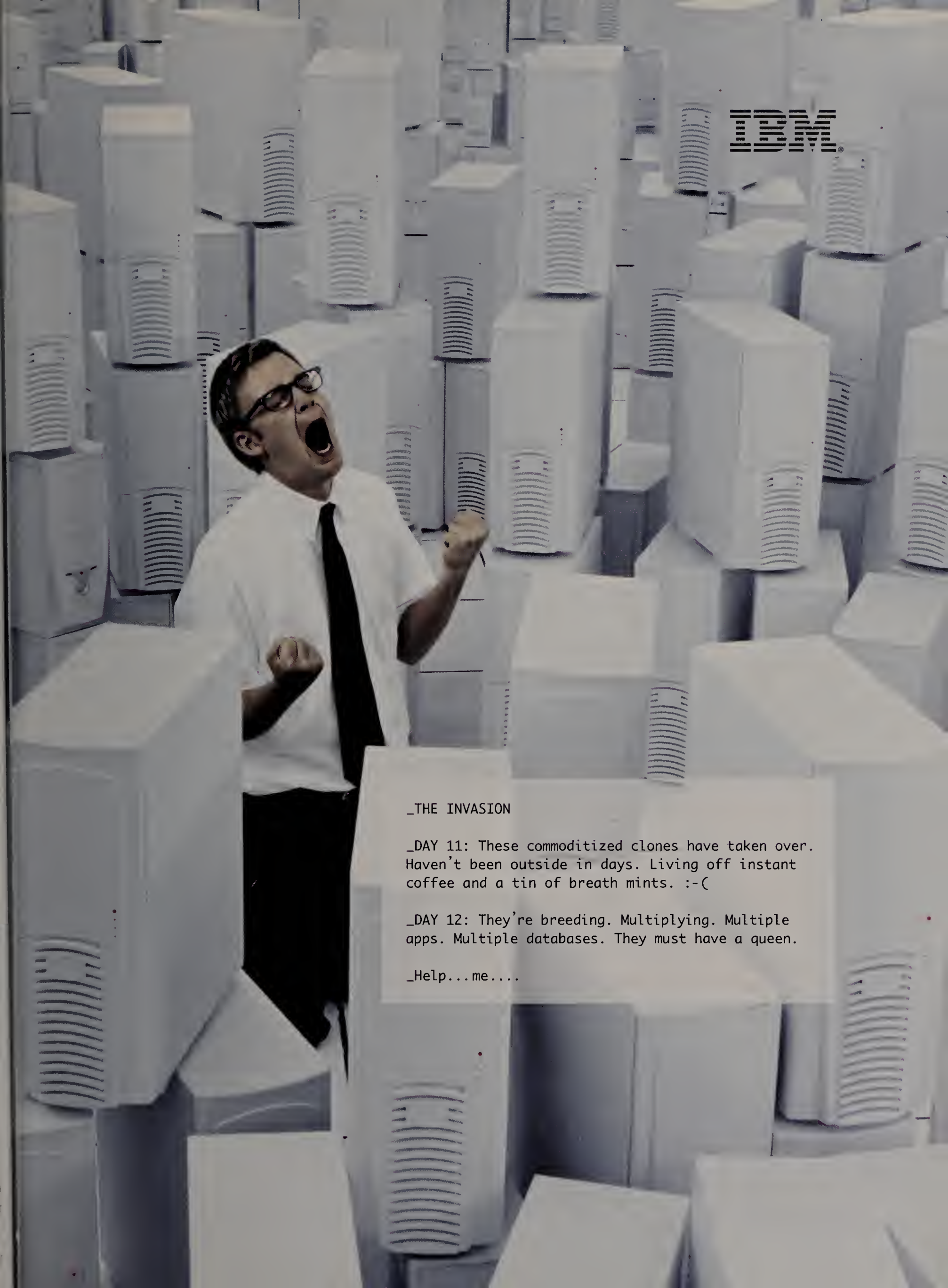
The Bush Administration's ambitious effort to connect millions of electronic health records via a national network poses major risks

The Bush administration has embarked on an ambitious national health-care initiative to improve the quality of medical care and stem its rising costs, which just in the last decade have risen to an estimated 15 percent of the gross domestic product (GDP), or about $1.6 trillion. The centerpiece of this initiative is a national health information network (NHIN) connecting millions of electronic health records (EHRs) for patients. Advocates of EHRs claim that the use of such records could shrink U.S. medical costs by hundreds of billions of dollars annually, reduce the estimated 100,000 lives lost through medical errors and improve the general quality of patient care. Toward that end, President Bush has set up an Office of the National Coordinator for Health Information Technology inside the Department of Health and Human Services.

I find the argument for EHRs very compelling, both from a personal perspective (as a person who has endured surgery several times) as well as a professional one (as a systems engineer who has worked on large-scale software systems in commercial and government sectors). But in this particular case, my risk alarm bells are ringing loudly.

Why? Take, for example, the often intemperate language being used to sell the national health information network. "Paper [medical] records are an utterly irrational national security risk," and are financially and morally wrong for

ILLUSTRATION BY JOSEPH GAST



_THE INVASION

_DAY 11: These commoditized clones have taken over. Haven't been outside in days. Living off instant coffee and a tin of breath mints. :-(

_DAY 12: They're breeding. Multiplying. Multiple apps. Multiple databases. They must have a queen.

_Help...me....

America, says Newt Gingrich, who has teamed with Senator Hillary Clinton and others to push for EHRs. Other EHR advocates imply that doctors who don't embrace it are harming their patients. I know that to get something moving in politics, over-the-top language is sometimes necessary, but it doesn't help to imply that anyone questioning the value of EHRs is immoral or indifferent to national security or their patients. Further, some government health officials are saying that everyone should "get" with the NHIN program or expect one to be imposed. In my experience, resorting to not-so-veiled threats automatically makes me question the feasibility of the underlying business case.

Advocates of EHRs list a myriad of "challenges" to creating a national health record network—interoperability, privacy, security and making the business case for a decent return on investment to small physician practices that will have to invest in such records to achieve their promise. (For more on this, read "The Business Case for Paperless Medicine," Page 64.) Additionally, studies claiming the benefits of a national health information network contain several assumptions. One of the most significant is that networks are composed of EHR systems that are "well-defined and effectively implemented." Yet EHR systems are very complex, human-centered IT systems that must be highly tailored to their operating environment. The HHS department itself has acknowledged that the failure rate for EHR system implementations is 30 percent to 50 percent. Some health-care network providers claim it is as high as 70 percent. So, with thousands of such systems yet to be implemented and interconnected into an interoperable whole, are the benefits being touted realistic?

Questions of Trust

Everyone agrees that any system of networked medical records must be trustworthy. The medical information in such a system must be complete, free from error and secure, and the confidentiality of the material must be maintained. But how free from error will the conversion of current paper-based medical records to an electronic format be? One study reported a 10.2 percent error rate in transcribing just 2,098 children's vaccine records from paper to electronic records. Other studies indicate that a 2 percent to 5 percent transcription error rate is not unrealistic. Who will be responsible for finding and fixing these types of errors? The doctor? The patient? If someone makes a typo, who would know the difference between Flomax or Volmax?

The need for maintaining privacy is another requirement of the medical network that everyone agrees must be built in from the start. However, even the Department of Defense has a hard time keeping its networks safe from hacking. Even Guidance Software, a leading company that sells forensic software to detect hackers, recently got hacked. Given that 80 percent of U.S. doctors are in practices of eight or fewer physicians, can we expect them to install and keep updated all the security controls required to keep EHRs private?

Given that 80% of U.S. doctors are in practices of eight or fewer physicians, can we expect them to install and keep updated all the security controls required to keep electronic health records private?

Psychiatrists especially are alarmed that their patients may not want their records put into EHRs because of the risk of disclosure. Unfortunately, mental illness and even temporary behavioral ailments still carry a societal stigma, and can hinder employment and some types of insurance coverage. If psychiatric patient records are included in EHRs, patients may decide to stop their treatments. Other patients may decide to opt out as well because of the potentially embarrassing information being captured. Are we going to end up with a medical digital divide as a result?

Even assuming a secure network, the availability of EHRs may encourage not-so-subtle medical redlining by employers and insurance companies. For instance, some insurance companies and employers are promising not to use DNA results in determining eligibility for their health care or benefits plans. The availability of cheap, fast and widespread DNA testing in less than a decade makes such promises suspect. And keep in mind that with access to EHRs and data mining, it is possible to create a genetic profile of a person without ever resorting to DNA.

Who's in Charge?

Another risk that gives me pause is the number of players involved in creating the national EHR network. Not just the 650,000 doctors, 5,800 hospitals, and countless other health-care facilities, but all the players who wish to be involved, from standard bodies to medical associations to EHR suppliers. As of this time, there are 18 bills related to EHRs being contemplated in Congress, each with slightly (or greatly) different consequences for a national system. It has gotten so bad that the HHS has had to politely ask Congress not to be so "helpful."

New organizations are springing up almost weekly, each wanting a say in defining EHR standards. Different groups, from clinical researchers to insurance companies, are lobbying

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The availability of EHRs may encourage not-so-subtle medical redlining by employers and insurance companies that have access to sensitive medical data.

hard for what they believe should be included in EHRs. Requirements creep is bad in any IT project—what is happening here is requirements rush. It is not being overly facetious to suggest that President Bush's 2014 target for EHR adoption may arrive before the first proposed draft of EHR standards is reviewed, let alone agreed upon, if everyone wanting to participate is involved. Are we heading towards a situation where we will end up with everything we asked for but nothing we want?

Similarly, will those who have already invested in EHR systems, such as Kaiser Permanente, which is investing billions of dollars as we speak, be willing to change to meet a new standard? Especially if the EHR standard requires major revisions of their currently working systems?

Advocates of the national health information network also agree that for it to be effective, there will be a need for massive cultural changes in financial incentives for physicians and in the way they practice medicine. Further, to achieve the postulated cost savings such a network would bring, patients must also assume greater financial responsibility for and decision making concerning their own health care. To expect three simultaneous revolutions in 10 years seems a bit optimistic.

So far, most of the discussion about the cost of the national network—estimated by a 2005 RAND study to be $156 billion to implement and another $48 billion a year to operate—has been about what doctors and other health-care providers will need to invest. Very little has been written about the impact on patients, who will ultimately be the ones to foot the bill. Are you willing to pay about $500 ($2000 for a family of four) for a network of medical records, along with another $150 yearly maintenance fee per family member? What about $750 or $1000, if the current cost estimates are too low? Will fewer people be able to afford to pay these kinds of premiums for health care? Studies of even small increases in copayments in Medicaid show that they force the poor to go without medical care.

Needed: A Comprehensive Risk Assessment

I have only touched on a very few of the multitude of issues involved in creating an NHIN. What disturbs me most is that I don't see any comprehensive risk management plan for this effort, nor do I see much in the way of a desire to define one. As anyone who has been involved in large-scale endeavors, managing the risks involved from a total enterprise perspective is absolutely vital to achieving success. If the NHIN is so critical to the nation, if it will radically transform health care in this country, shouldn't there be at least some systemic risk management plan with the risks defined, prioritized and where possible, mitigated?

Since new systems always introduce unexpected problems, such potentially perverse consequences also need to be part of such a plan. Studies have shown that poorly implemented computer physician order-entry systems actually can increase medical errors, for example. What could happen if a large number of poorly implemented EHR systems get interconnected?

Furthermore, paper may kill, but so does not washing your hands. Hospital infections are a large problem because health-care providers routinely fail to wash their hands in between seeing patients. Why isn't there an urgent national effort to address this issue? Instead of waiting for an electronic network to be built, resources need to be directed at mitigating the risks and problems that are unnecessarily costing lives and money today.

I remain unconvinced that the approach currently being taken can develop an effective national health information network, let alone one by 2014. The effort is an unprecedented endeavor, yet the office of the National Coordinator for Health Information Technology is chronically underfunded. Neither the government commitment nor the rhetoric about its importance seem commensurate with the risks or rewards involved.

The creation of this network will, with little doubt, foster a revolution in health care in the United States. But this revolution could be especially messy, given the magnitude of the changes it portends and the new health-care covenant it promises Americans. An enterprise risk management plan would add greatly to the national dialogue and let everyone know what is at stake. By understanding the risks better and then investing the necessary resources for attacking them aggressively, maybe we can truly gain lasting and fair health-care benefits at an acceptable cost for all Americans. CIO

Robert Charette is the president of Itabhi, a company that specializes in enterprise risk management. He is also the chair of the ISO/IEEE Standard on systems and software engineering risk management. He can be reached via e-mail at *charette@itabhi.com*. Please send comments to Executive Editor Alison Bass at *abass@cio.com*.

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Closing Address: Leadership & Ethics—Defining Moments
Joseph L. **Badaracco**, Author and Professor of Business Ethics, Harvard Business School

"Defining moments" occur when work choices and life choices become one. Badaracco examines the right-versus-right conflicts that every leader faces and presents an unorthodox yet practical way for you to think about and resolve them.

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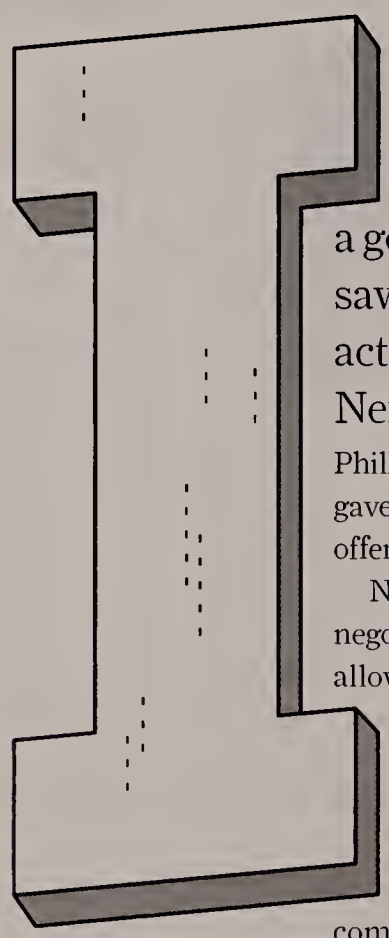
Wi-Fight

A growing number of cities and towns want to develop their own public Wi-Fi networks. But they face stiff opposition from telecom and cable providers.

BY SUSANNAH PATTON



In November 2004, Philadelphia CIO Dianah Neff got a surprise telephone call from a city attorney. While watching a government-access TV channel the night before, that attorney saw that House Bill 30, a rewrite of the state telecommunications act, had a new provision attached to it—one that could derail Neff's plan to provide low-cost wireless Internet access for all Philly residents. Pennsylvania Gov. Edward Rendell ultimately signed the legislation, which gave telecom companies doing business in the state the right to block any municipality from offering a paid Wi-Fi service.

Neff fought the move. With help from Philadelphia Mayor John Street, she was able to negotiate a waiver with Verizon Communications—the city's dominant phone carrier—that allowed Philadelphia to move forward with its municipal Wi-Fi plans. Other Pennsylvania towns may not be so lucky.

More than 200 cities and towns across the United States are planning, testing or building out municipal broadband networks. Many are using Wi-Fi technology to build networks for public safety, government and residential use, saying telecom and cable providers aren't moving fast enough to provide their services at an affordable rate. But these municipalities face some formidable opponents. The country's largest telecom and cable providers argue that the government shouldn't provide services the private sector already offers. And even as those providers say publicly that they won't work to stop the projects, their representatives are

Reader ROI

:: Why cities and towns are jumping on the public Wi-Fi bandwagon

:: What private-sector broadband providers are doing to stop them

:: Why CIOs need to understand the looming legal battles over Wi-Fi

busy behind the scenes at the state and national level lobbying for legislation that could prevent municipal broadband and Wi-Fi projects from moving forward.

Opponents of municipal Wi-Fi see such projects as a threat that could cut into their profits. "It costs a lot of money for [telecom] companies to put their networks in place," says Michael Balhoff, a former telecom equities analyst with Legg Mason and a municipal broadband critic. "If they have to go up against cities offering free and subsidized services, this will undercut their return on investment." Some states have passed legislation that limits or bans such projects, and two legislators—Rep. Pete Sessions (R-Texas) and Sen. John Ensign (R-Nev.)—have introduced bills that would hamper municipal Wi-Fi plans. Some cities, such as Lafayette, La., have been hit by telecom companies with expensive and time-consuming lawsuits aimed at thwarting their municipal Wi-Fi projects.

The debate over municipal Wi-Fi hinges on a central question: Should broadband Internet access be a public service provided at a regulated price like water and electricity, or should it be an exclusively private-sector offering? Some municipal Wi-Fi advocates point to statistics showing that the United States is dropping behind in broadband usage because of the slow pace of the private sector. They say government CIOs should take a lead in offering Wi-Fi coverage in order to keep up with the rest of the world's leading countries and boost economic development in their own states and municipalities. (The International Telecommunication Union announced this year that the United States has fallen from 13th place to 16th place in broadband usage as of December 2004. South Korea, Hong Kong and the Netherlands now lead the list.) In addition to helping bridge the so-called digital divide between wealthier and low-income residents, advocates say the service will also boost economic development by attracting conventions and other business to a community. Wi-Fi can also help communities upgrade aging public safety and government communications infrastructure.

This issue is of major significance to any government CIO who wants to gain experience with a quickly changing technology and improve government services. And those interested in implementing municipal Wi-Fi should be up to speed on the local and federal roadblocks to such projects. "If a CIO wants to take Wi-Fi to residents, they will need a legal strategy," says Neff. And while some may be reticent to battle with giant phone and cable companies, an increasing number of cities and towns are partnering with the private sector to move ahead with wireless broadband. At this point, experts say, waiting could be costly.

"This debate has been a waste of everyone's time and money," says James Baller, a communications lawyer at Baller & Herbst Law Group in Washington, D.C., and a vocal advocate of Neff's project. "The U.S. has fallen behind others in developing broadband infrastructure. We don't have the luxury of continuing to bicker."

Call of the Wi-Fi

In February of 2004, 12 of Philadelphia's top appointed officials met for their annual retreat with Mayor John Street. For Neff, the meeting at the Horticultural Society in Fairmount Park was the perfect opportunity to bring up a technology she had been follow-

ILLUSTRATIONS BY JASON LEE

ing for months: Wi-Fi. Short for "Wireless Fidelity," Wi-Fi is another name for IEEE 802.11b, a trade term coined by the Wireless Ethernet Compatibility Alliance (WECA).

"I told everyone there this technology could help the city complete its goals," Neff says. In Philadelphia, where 25 percent to 30 percent of the population falls under the "disadvantaged" classification, Mayor Street had embarked on an ambitious economic development plan to help poverty-stricken neighborhoods revitalize themselves. Neff felt that a program to provide computers and to train people to use them, combined with low-cost broadband access, could play an important role. Neff estimated at the time that Verizon covered 60 percent of the city's population. Verizon countered that it covered 80 percent and now says that more than 90 percent of their lines in Philadelphia are equipped for DSL service. Still, Neff and her team surveyed residents and found that those with dial-up service or no Internet said DSL or cable broadband was too expensive. (Verizon offers DSL for as low as $14.95, but only when it's bundled with phone service. Faster services cost $29.95 a month. (Comcast also offers higher-cost services that include bundled TV, cable access to the Internet and digital phone service.)

In June 2004, the city set up free Wi-Fi access in central Love Park, using wireless "mesh" technology. Wireless mesh essentially consists of network nodes placed on city streetlights and poles or other access points and allows wireless connectivity beyond a single "hot spot." Before wireless mesh came along, some kind of "backhaul," or Internet access fiber, was necessary at each hot spot, meaning Internet users could get access at the coffee shop or airline terminal but not beyond a small area. After residents responded enthusiastically to the pilot, the city created a nonprofit organization to oversee its expansion.

Philadelphia now has about seven square miles covered with a wireless "mesh" network that provides free service during a pilot period. The nonprofit group "Wireless Philadelphia" is expected to get final approval from the City Council this spring that will allow EarthLink to use city-owned telephone poles to build out the network. Neff expects to blanket the city's 135 square miles with high-speed Wi-Fi service by spring 2007. Then, multiple ISPs will be able to pay EarthLink to use the infrastructure and charge residents and small businesses roughly $20 a month to use it. Originally, the city planned to issue taxable bonds to pay for the network. Then, after issuing an RFP last April, EarthLink—looking to expand its business from dial-up service—came forward with an offer to build the roughly $15 million network at its own expense. Neff says the city has already invested roughly $750,000 in negotiating the deal.

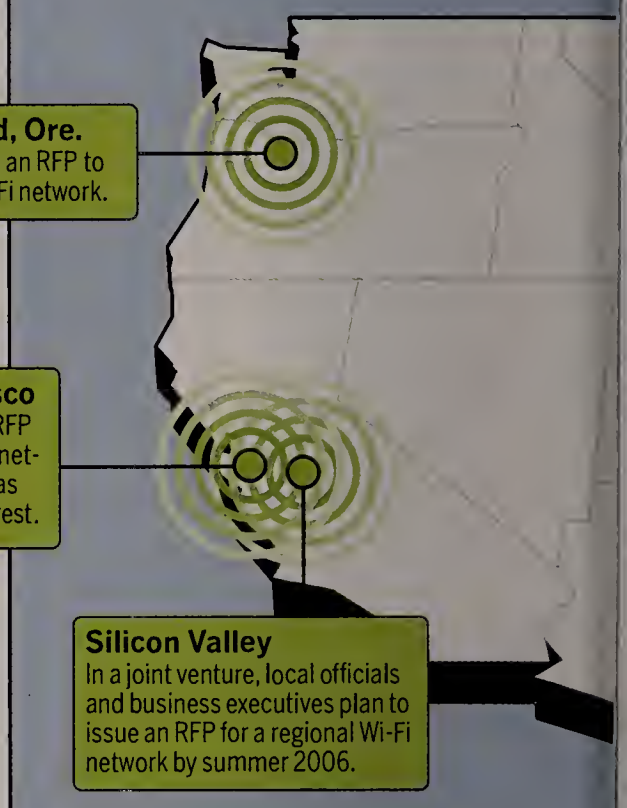
Verizon and other telecom companies argue that public initiatives for broadband are generally unnecessary because most residents of larger cities and towns have alternatives from the private sector. "There's no real argument that broadband isn't available," says Verizon spokesman Eric Rabe, who adds that broadband prices have been falling. "For a city like Philadelphia to say this is just nonsense."

However, Neff feels strongly that "Wireless Philadelphia" will help bridge the "digital divide" in her city. Already, she adds, community groups in the poorest neighborhoods have started connecting to the network, which now runs at speeds of 1Mbps, slightly faster than DSL. Small businesses in the city have expressed enthusiasm for the project, although midsize and large businesses are not likely to use the network because they often require higher speeds and more security. Neff expects that the entire city will be covered by summer 2006.

With Philadelphia out of the starting gate, other cities and towns have rapidly been

Wi-Fi America

Cities planning Wi-Fi networks, and the state laws aimed at thwarting them



The Federal Picture

Pending and existing federal laws that could affect municipal Wi-Fi and broadband

H.R. 2726 - Introduced by Rep. Pete Sessions (R-Texas) on May 26, 2005. The bill aims to "prohibit municipal governments from offering telecommunications, information or cable services except to remedy market failures by private enterprise to provide such services."

S. 1504 - Introduced on July 27, 2005, by Sen. John Ensign (R-Nev.). The bill, which is a rewrite of the broad Telecommunications Act of 1996, includes a section that limits local governments' abilities to deploy public broadband systems.

S. 1294 - Introduced June 23, 2005, by Sens. John McCain (R-Ariz.) and Frank Lautenberg (D-N.J.) "to amend the Telecommunications Act of 1996 to preserve and protect the ability of local governments to provide broadband capability and services."

The bottom line on business value

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EXECUTIVE SUMMARY With new enhancements, Microsoft® Software Assurance is more than just an upgrade. It offers a broad range of tools and resources to maximize the value of Microsoft software investments. Read this paper to learn more about the business value of Software Assurance, and how its enhancements benefit workers and managers throughout your company.

TO CRAIG KAPLAN of Wipfli LLP, one of the Midwest's leading professional services firms, Software Assurance is all about enhanced business value.

CIO at the Wausau, Wisconsin-based consulting and accounting group, Kaplan looks to Software Assurance not just to simplify technology migrations and enhance budget predictability—but more to maximize the benefits of Wipfli's Microsoft-based infrastructure, and at the same time help realize the company's greater strategic goals.

"Software Assurance is the glue that holds our Microsoft technology together," Kaplan says. Since taking advantage of the program's productiv-

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ity benefits, tools and training, Wipfli has improved in-house technology migrations and knowledge transfers; boosted end-user effectiveness; and saved an estimated $390,000 in training costs.

"Software Assurance saves us money up front in training for IT staff and end-users, and then continues to save us money by making us more productive," Kaplan says.

Now more than ever, smart software investments are critical to business success. Business leaders such as Kaplan know they must acquire and deploy the technologies that cost-effectively drive productivity.

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The pure business value of Software Assurance is easy to quantify. With the agreement's ability to spread payments over time, business leaders can create a more predictable IT budget and take advantage of flexible payment options. For example, you can spread payments over three years.

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DEPLOYMENT SERVICES	• Own upgrade licenses that are not deployed • Manually deploying upgrades and patches • Security, stability and support concerns from old technology	• Desktop Deployment Planning Assistance for EA and Select customers • Information Work Solution Services for Open Value customers • Additional Training vouchers for large organizations
PRODUCTIVITY SOFTWARE	• Lost productivity from issues with old technology	• Windows Vista Enterprise provides exclusive features including Virtual PC Express • Windows Fundamentals for Legacy PCs enables upgrading to latest OS for better stability and security

Lori Newman, Marketing Director for Software Assurance at Microsoft Corporation.

But Software Assurance is about much more than just upgrades. It's about tangible business benefits that are felt throughout a company, including:

STRATEGIC DEPLOYMENT The single largest cost companies face in managing their desktops is the cost of deploying and managing the desktop environment. Minimizing this cost, as well as the IT resources required for its deployment, is key to improving operational performance and enhancing ROI—key metrics that appeal to senior business leaders. Software Assurance addresses these priorities through deployment planning assistance.

In years past, software agreements were simply about licensing. Disk in hand, IT staffers set about the arduous task of getting the software installed and working. Now, Software Assurance benefits provide tools and services to streamline deployment.

Under the Information Work Services Solutions program, midsize businesses are entitled to one-to-two day collaborative workshops to help discover, prioritize and design solutions that can have a rapid impact on their business. "Our subject-matter experts first help the customer evaluate their business issues and current technology," Newman says. "Next they identify and prioritize the Information Work solutions that will best help meet the goals of the organization, and finally they help design a solutions architecture that is based on the client's IT infrastructure." In the one-day Information Work Value Discovery Workshop, experienced consultants work with business leaders within the

Software Assurance over the Software Lifecycle
KEY BENEFITS

PLAN **Affordable access to the latest technologies**

DEPLOY **Strategic planning for immediate business value**

USE **Training courses, simplified desktop management**

MAINTAIN **24x7 support online or by phone**

TRANSITION **Extended support for legacy systems**

company to map business goals to technical strategies. Similarly, in the two-day Information Work Architecture Design Workshop, consultants engage technical staff to determine how new technology will integrate into existing infrastructures.

The Desktop Deployment Planning Service helps IT leaders execute a thorough desktop deployment project complete with analysis, business case development, process management planning and technical support. The service also offers:

- Expert assistance from Microsoft partners who specialize in deploying Microsoft Office software and Microsoft Windows®-based operating systems.
- Personalized service from trained service providers, including demos, lab set-up, and training.
- Best practices and tools, such as an application compatibility toolkit and user-state migration toolkit.

"In the end, executives walk away with a customized plan and cost model, plus proven techniques to automate desktop builds, migrate user data and streamline recurring processes," Newman says.

USER TRAINING For the average employee, convenient, comprehensive training solutions are another way that Software Assurance empowers workers throughout the business. By building these valuable skills, companies lower their deployment and support costs, as well as improve employee productivity.

For employees who prefer the flexibility of online courses, Microsoft E-Learning offers on-demand training and virtual labs. For those who prefer a traditional classroom environment, instructor-led courses offer interaction and feedback from expert trainers.

Software Assurance also includes training vouchers designed to reduce your costs and help train more staff. You can redeem training vouchers for select courses from Microsoft Certified Partners for Learning Solutions—the authorized training channel for Microsoft technology.

"I think that the training benefits are most valuable to customers because that's something that has been slashed out of budgets," says Laura DiDio, Analyst at The Yankee Group. "Any time these folks can get out, mingle and talk to professionals and have it bundled in as a free service, it really does add to the value of a Microsoft license."

LEGACY TRANSITION

For Business leaders looking to extend the lifetime of legacy PCs, Software Assurance offers two strong solutions:

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5. **Activate and use the benefits when you need them most**

Knowledge is Power—And Value

Deployment and training are just two of the newest enhancements from Software Assurance. Yet, they clearly speak to the greater business value of the package: Software Assurance isn't just about technology upgrades; it's about improving productivity, predictability and agility throughout your business.

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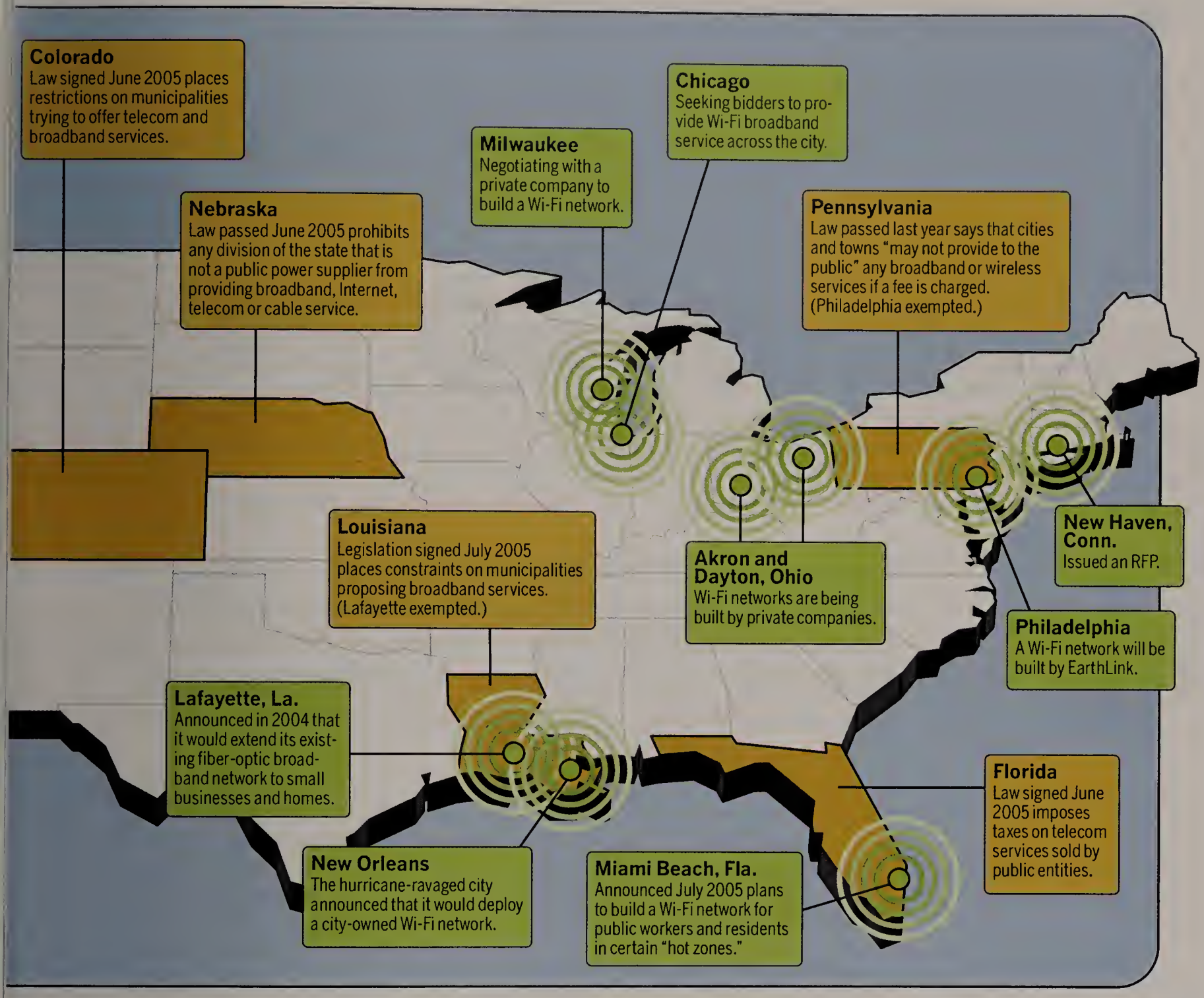


coming up with their own plans. (For more on this, see "Wi-Fi America," this page.) In San Francisco, city officials issued a formal RFP in December for a citywide network, although 26 vendors have already expressed interest in building the wireless system. Most notably, Google has garnered headlines with its offer to build the network at its own expense and provide Wi-Fi service for free in the city. Chris Vein, San Francisco's executive director of telecommunication and information services, said the Wi-Fi project is part of an overall plan to bring technology to all San Franciscans. The plan includes providing computer equipment to those who need it along with education and training.

Smaller cities, such as Dayton, Ohio, and Tempe, Ariz., are also joining the Wi-Fi bandwagon. In Dayton, CIO Bill Hill decided in April 2004 that the technology was ready for a wireless mesh deployment in his city. But he, along with two city commissioners, wanted to make sure the network wouldn't cost the city or taxpayers a cent. So he took his idea to local companies to see if there was an interest in helping the city out. There was. A Dayton ISP called DoNet is now working with P&R Communications, a local radio shop that installs radio gear, to build the mesh network. "My argument to the telcos is, Had you offered these services locally, there would have been no need to go forward," Hill says. "We had to do something because our needs were not being met by the telcos. They want to charge $59 to $79 a month. What poor person can afford that?"

The Legal Battle

Despite the clear-cut benefits, the road to municipal Wi-Fi or broadband is strewn with land mines. Just ask the rural town of Lafayette, La. Phone company BellSouth filed a lawsuit last year against Lafayette and its utility systems, alleging that the municipality used incorrect procedures to issue bonds to pay for a plan to wire the city with fiber-optic cable. Lafayette voters have since voted to approve the plan, but the legal battle cost the city hundreds of thousands of dollars.

Regional and national cable and phone carriers have spent billions of dollars to build broadband networks across the United States, and they have worked publicly and behind the scenes to block efforts that would create new competitors for their services, whether wired or wireless, experts say. Already, 14 states have enacted laws that would prevent or make it difficult for cities and towns to go forward with plans

like those in Philadelphia and San Francisco. In San Francisco, Mayor Gavin Newsom says he fully expects lawsuits against the city's Wi-Fi plans.

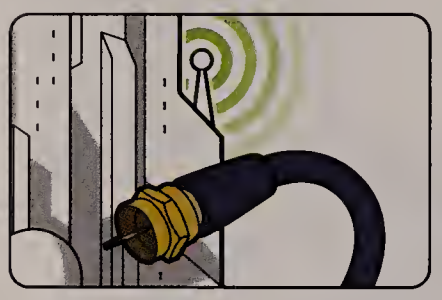
The debate is also being played out on a national level. Congressman Sessions, a former SBC executive, introduced a bill last year in the House of Representatives that would prohibit state and local governments from offering telecommunications services unless the area wasn't being served by a private company. According to Sessions' House financial disclosure statement for 2003, he held SBC stock options worth at that time from $500,000 to $1 million. Gina Vaughn, a spokeswoman for Sessions, says his position on this issue "is consistent with the position he's held in the past—if you can find a service in your local yellow pages, the government shouldn't be providing it." Vaughn says Session's previous employment at SBC had no influence on the bill.

In July of last year, Sen. Ensign, who is a member of the Republican High Tech Task Force, introduced the "Broadband Investment and Consumer Choice Act," which, if passed, would also make it more difficult for cities to build wireless networks. (For more, see "The Federal Picture" on Page 52.) And who is behind these state and federal legislative efforts? The telecom and cable giants, according to a report from the American Public Power Association (APPA), a national trade group for the country's community-owned electric power utilities.

"At the state level, there are telecom and cable companies lobbying for bills that would create barriers to community Wi-Fi or broadband services," says Desmarie Waterhouse, government relations representative for the APPA. "In other cases, these types of restrictions are being pushed by third parties with close ties to these companies." BellSouth, for example, has been fighting hard against Lafayette's plan, she says.

Some analysts say that the big providers needn't worry about losing business from consumers who now rely on high-speed broadband from a telecom or cable company. These more affluent consumers won't be tempted to switch to a city-sponsored service that would most likely be slower. "The fact is that cities going after Wi-Fi shouldn't be threatening to the telcos," says Ellen Daley, Forrester Research analyst.

Some high-powered legislators agree. In response to the anti-Wi-Fi bills, Sens. John McCain (R-Ariz.) and Frank Lautenberg (D-N.J.), have recently introduced legislation that would allow cities and towns to offer broadband if they decide to. Those involved in the fight think there will be some sort of compromise between the two sides, but some, acknowledge that municipalities face a stiff challenge. "Chances are that business interests will be heard," says San Francisco's Vein.



Even as the telecom giants say publicly that they won't oppose municipal Wi-Fi, their representatives are busy behind the scenes at the state and national level lobbying for legislation that could prevent such projects from moving forward.

Whither Wi-Fi?

Municipal Wi-Fi critics also argue that cities and towns won't be prepared to deal with the technological challenges they might face as they move forward with Wi-Fi. These challenges include maintaining the networks, dealing with crowded networks and monitoring an evolving technology that may soon be replaced by other types of wireless broadband. "Wireless infrastructure is changing rapidly," Balhoff says. "Cities will have a hard time keeping up with capacity requirements."

Daley agrees that mesh technology, in particular, has yet to be tested in high-capacity Wi-Fi networks. "Cities are playing with an unknown," she says. "If a lot of people jump on an unlicensed band at once, the service will get pretty slow." In San Francisco, Vein says the biggest challenges he faces on a technical level are whether to go with existing Wi-Fi (802.11) technology or wait for WiMax, a newer technology that has yet to be proven on a large scale but has certain technical advantages over Wi-Fi and should permit usage over greater distances. San Francisco also has a "topography problem," Vein says, which means that the city's hills and peaks could make it difficult to cover all 49 square miles.

As the city of Philadelphia readies its own Wi-Fi network, Neff has been in demand on the public broadband circuit. She says she's talked with and given advice to close to 100 cities in 15 countries. In five years, Neff hopes to increase broadband connectivity in Philadelphia from 58 percent to 80 percent and place 10,000 computers in lower-income neighborhoods with training for its residents. "In the end, we're trying to give people new skills," Neff says. "Wi-Fi is just one tool to help us do this."

It's too early to determine whether the various municipal Wi-Fi efforts will succeed or fail, but those interested in the evolution of the technology and the debate will be watching closely. Already, predictions are all over the map. "I'll bet you two years from now, Philadelphia's network won't be worth anything," says analyst Balhoff. "I think it's probable that subscribers won't be there."

On the other side of the argument, San Francisco's Vein proclaims, "I think Dianah Neff will have the last laugh. Her model is changing and evolving and, in the end, she will be successful." CIO

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Add Your Voice

As a municipal CIO, have you experienced difficulty in your efforts to build a municipal Wi-Fi or broadband network in your community? To add a comment, go online to **www.cio.com/040106**.

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The Metrics TRAP...

AND HOW TO AVOID IT

Calculating IT spending as a percentage of overall revenue is easy, popular...and misleading. There's gotta be a better way. In fact, there are several.

BY CHRISTOPHER KOCH

Joe Drouin caught a lucky break when he became VP and CIO of TRW Automotive in 2002—or so he thought at the time. A consultancy brought in to benchmark all of TRW's internal functions—everything from IT to legal to sales—found that the company was spending less on IT as a percent of overall revenue than the industry average, which was about 1.5 to 2 percent.

Not one to look a gift horse in the mouth, Drouin played the metric for everything it was worth, highlighting it in every PowerPoint presentation he could during his first year as CIO. "I used it to say, we are managing IT effectively, and here's the confirmation from this outside firm," recalls Drouin. "It made me one of the good guys in the eyes of the CEO and COO." At one point, the CEO, who believed that inexpensive IT was good IT, joked that he expected to see Drouin and his staff outfitted with T-shirts that had the percentage stamped across their chests in big, block numbers.

Reader ROI

:: The problems with measuring IT spending as a percentage of revenue

:: Metrics that better reflect the value of IT

:: Why spending metrics need to align with overall business strategy

But as that first year wore on, Drouin felt less and less like wearing that T-shirt. "I was guilty of using the number not because it demonstrated the value of IT but because it showed a positive trend," he admits.

The shallowness of the benchmark became clear as Drouin prepared his first budget presentation. The CEO asked him to break out IT spending as a percent of revenue for TRW Automotive's 12 individual business units, each of which had its own legacy infrastructure and independent IT spending patterns. As it turned out, costs ranged significantly across the units. In fact, some units were spending two to three times more than others on a percentage of sales basis.

Suddenly, Drouin didn't look like one of the good guys anymore.

He looked like a manager whose costs were out of control.

Much to Drouin's chagrin, the CEO initially tried to use the percentages to reduce the budgets of the higher-spending units. But it quickly became clear that the spending had no correlation to business success. Some of the units spending less on IT as a percentage of revenue were not doing as well as units spending more. Worse, if TRW Automotive's overall revenue fell (which was a distinct possibility given the auto industry's struggles), Drouin's IT spending as a percentage of revenue was going to rise even if he didn't spend an extra dime on IT.

"It's disappointing to be measured on one simple metric, only half of which I have any real control over," a sadder but wiser Drouin says now.

TRW Automotive CIO **Joe Drouin:** "It's disappointing to be measured on one simple metric."

Caught in the Metrics Trap

USING PERCENT OF revenue as a foundational metric to measure IT tends to cast IT in the role of a cost to be controlled. "When CEOs focus on spending as a percent of revenue, it's because they've already decided to cut IT spending and they use the data as a justification," warns Barbara Gomolski, research vice president for Gartner. "It's hard to use this metric to show that you are doing the right thing." In this zero sum game, success is defined simply as lowering the percentage over time. "It's not clear how low it should go," says Drouin. "Joking with the CEO, I said, 'In your mind it should be zero.' We had a good laugh, but at what point do we decide it's at the right level and you don't drive it down further?"

Drouin wanted to burn those old PowerPoint slides. "I used the metric to my advantage, and it turned around and bit me," he laments.

It was too late to put the cat back in the bag. Nor was it an option to complain about how unfair the metric was. Rather, Drouin knew he needed to educate the CEO and COO about what constituted constructive cost-cutting in IT versus that which would rob IT of its ability to provide strategic differentiation. "I still mention the metric," says Drouin, "but I don't dwell on it." Instead, he emphasizes benchmarks that are more specifically targeted—such as the per-user cost of ERP systems in the

PHOTO BY ROY RITCHIE

different business units—to show that he's lowering costs in a way that will help the business rather than paralyze it.

But it's hard to get away from such a deceptively simple measurement—IT spending as a percentage of revenue—which remains "far and away the most popular metric for benchmarking IT spending," says Gartner's Gomolski, who's not at all happy about it.

"Top business executives don't want a dozen different metrics," Drouin explains. "The COO said to me, 'Come up with another metric, and I will leave this one alone.' I consulted the consultants and the analysts, and they couldn't come up with one."

The reason Drouin's consultants couldn't offer him a magic metric is because one doesn't exist.

There is no single metric for determining the right amount of money, the right percentage of revenue, to spend on IT. Even those CIOs who believe that measuring IT spending as a percentage of revenue produces a legitimate benchmark, such as Dow Chemical's David Kepler, consider it a very rough start to a much deeper discussion of IT investment strategy. "My experience is it's relevant to describe about how much you should spend," Kepler says. But, he adds, "it says nothing about how effective your spending is."

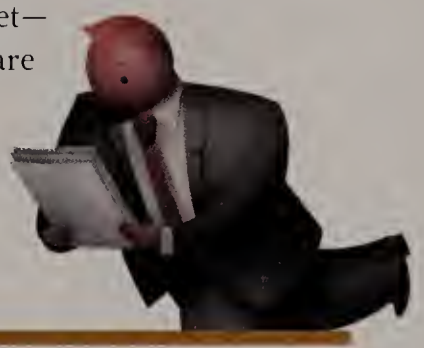
The problem most CIOs have to confront is that, in the view of much of the business, IT spending is a big black box. In fact, it's often the company's single largest capital expense and one that promises to grow larger as the world grows ever more digital. "The reason people attack IT over this metric is because they don't appreciate what you're spending and why," says Kepler. Unless CIOs can fill this gap in understanding with a delicate combination of relationship building, education and a series of contextual metrics designed to give businesspeople a sense of IT spending effectiveness, efficiency and value over time, CIOs will see their budgets reduced to a cost to be managed against a vague, often completely irrelevant, constantly sinking average.

Where the Wild Variables Live

THE IDEA OF DESCRIBING and analyzing IT spending in relation to overall revenue has been around for a long time—decades, say some analysts. One can attribute its longevity as a business metric to its simplicity and the ease with which one can make the calculation. It's also easy to get the benchmarking information out of your competitors. No one's giving away any trade secrets by filling out (often anonymously) a survey with their IT spending information.

But it's also a legacy from an earlier era. "The metric is from a time when people viewed IT as a utility rather than as something to provide strategic differentiation," says Scott Holland, senior business adviser for The Hackett Group.

It was, in many ways, a simpler time. In the days when mainframes ruled the earth, IT was more centralized than it is today and, consequently, costs were much easier to calculate. IT back then was basically a handful of really big machines, and the software and staff needed to run them. By comparison, today's Internet and PC-based computing infrastructures are much harder to account for. It's pretty easy for a rogue marketing department, for example, to buy its own servers and software without IT ever knowing. It's much harder to sneak a mainframe past building security. And IT today is a challenge to pigeonhole. For example, should a cell phone/PDA combination count as IT or telecom? And does telecom—traditionally separate from the IT budget—count toward IT spending? Is software depreciated over time or counted as a



Your Guide to Popular IT Spending Metrics

AS A PERCENT OF REVENUE

Pros: Easy to calculate; provides some basic insight into spending levels in specific industries. Widely used.

Cons: Averages can often mislead, masking wild variability in the sample. Fluctuating revenue can affect percentages. Doesn't distinguish between strategic and nonstrategic spending; doesn't describe impact, only costs.

LIGHTS-ON OPERATIONS AS A PERCENT OF REVENUE

Pros: Distinguishes between strategic and nonstrategic spending; can show trends in improved IT efficiency over time, even if overall spending doesn't change.

Cons: More difficult to calculate. Definitions of strategic and nonstrategic IT vary across companies and industries. Not widely used.

PER EMPLOYEE

Pros: Easy to calculate and widely used. Maps IT spending directly to those consuming IT services. Can be used with percent of revenue to gauge the true similarity of companies in an industry.

Cons: Outsourcing can skew numbers. Numbers can be unnaturally high in capital-intensive industries. Does not describe IT effectiveness, only costs.

PER USER

Pros: Can be useful for benchmarking the cost of well-understood categories of products and services, such as PCs or enterprise applications. Can be extrapolated into "unit cost" of automated services, such as ATMs in banking.

Cons: Does not differentiate between strategic and nonstrategic spending.

INDUSTRY STANDARD METRICS

Pros: Many industries have a favorite benchmark (such as "cost-per-ton" in the chemical industry) that is accurate and widely understood. Puts IT into a business context.

Cons: IT is generally one of the highest-cost services in a business. May make IT look egregiously expensive.

–C.K.

onetime expense? In all these cases, it depends on the analyst or consultancy doing the counting.

There are so many ways to account for IT that most CIOs dismiss the percent-of-revenue metric unless it is carefully targeted for their specific industry or industry segment. Yet even in an industry context, the averages can mask huge variations in the sample. Companies at the high end can spend as much as 100 times more than those at the low end, according to CSC Consulting. "If I say that the average age of my two children is 10, do I have an 11-year-old and a 9-year-old, or does my family consist of an 18-year-old and a 2-year-old? It is not enough to know the average. One must also understand the spread of the data," wrote Eugene Lukac, a partner with CSC, in a report about a recent CSC spending survey. Nor does the average account for a company's unique situation; for example, costs will vary wildly between a chemical company with 10 plants spread around the globe and one with three plants, all in New Jersey. (For other variables that figure in overall spending calculations, see "Why You're Spending More," this page.)

The Battle Over the Numbers

DOUGLAS NOVO, former CIO for Venezuelan chemical company Polinter, knows all about these variables. The chemical industry is capital-intensive, dependent on expensive plants and equipment, with low profit margins and unpredictable revenue. That volatile combination means chemical executives are always looking for ways to cut operating costs. To do that, they bring in consultants about every two years to compare their company with its peers and to run the numbers.

In Novo's case, the consultants told him in 1995 that he was spending 1.5 percent of Polinter's revenue, or about 1 percent more than his peers. Novo's response was simple and blunt: "Impossible!" (Indeed, other sources told him that the industry average for the petrochemical sector at that time was about 2 percent.)

What was he to do? The numbers he was being shown didn't jibe with his notion of reality but neither did they come out of thin air.

"There's no equivalent of Generally Accepted Accounting Practices for IT spending," says William Mougayar, VP and service director for Aberdeen Group. "Without some kind of standard for how to account for spending, you can't use percent of revenue to compare across individual companies. It's too hard to know what's being included and what isn't." (For a downloadable PDF of U.S. IT spending benchmarks by industry and by size of company, go to *www.cio.com/040106*.)

But now Novo was on the defensive. He had to justify $2 million in spending that suddenly seemed to place him on the wrong side of the chemical industry norm. First, he pushed back against the consultants' findings. He got them to accept the idea that perhaps Polinter only seemed to be spending more than its peers because those companies were failing to take all IT operational and investment costs into consideration. Novo argued that the greater centralization of Polinter's IT operations, as opposed to its competitors, made Polinter's accounting more accurate. And why should he be penalized for his accuracy? But basically it was still Novo's word against the consuitants.

So he fought back in a more constructive way: He created his own

Why You're Spending More

If your business benchmarks IT spending as a percentage of revenue, these 12 variables may be making you look bad

1. **YOUR PRODUCT**
   A high IT element in products (insurance and financial products, for example) usually means higher IT costs.
2. **BUSINESS VOLATILITY**
   If you are absorbing another company in an acquisition, your spending will be higher than normal.
3. **ORGANIZATIONAL STRUCTURE**
   A decentralized IT structure is more expensive to operate than a centralized one.
4. **COMPETITIVE PRESSURE**
   If your company focuses on using IT to add new business capabilities, your spending will be higher.
5. **GEOGRAPHY**
   A global enterprise's IT is more expensive than that of a local or regional company.
6. **SIZE**
   Smaller companies tend to spend more on IT as a percent of revenue than larger companies in their industry. (Big companies tend to spend more per employee because they tend to be more complex.)
7. **COMPLEXITY**
   Highly complex IT infrastructures (many different systems, many older systems) cost up to 50% more to maintain than low-complexity infrastructures (standardized, few applications).
8. **APPETITE FOR RISK**
   Aggressive adopters of new technology may outspend mainstream adopters by 30% and risk-averse companies by 50%.
9. **SERVICE LEVELS**
   High service levels (for mission-critical IT) cost more to maintain than low service levels.
10. **BLIP SPENDING**
    Upgrading a system or refreshing all the old PCs across the company can raise costs temporarily.
11. **ROGUE SPENDING**
    Companies where IT is decentralized and business functions have the power to buy their own IT will spend more.
12. **REVENUE PER EMPLOYEE**
    Companies with high revenue per employee will tend to have more knowledge workers who use IT intensively, thus pushing up IT spending levels per employee.

–C.K.

SOURCES: Aberdeen Group, Forrester, Gartner

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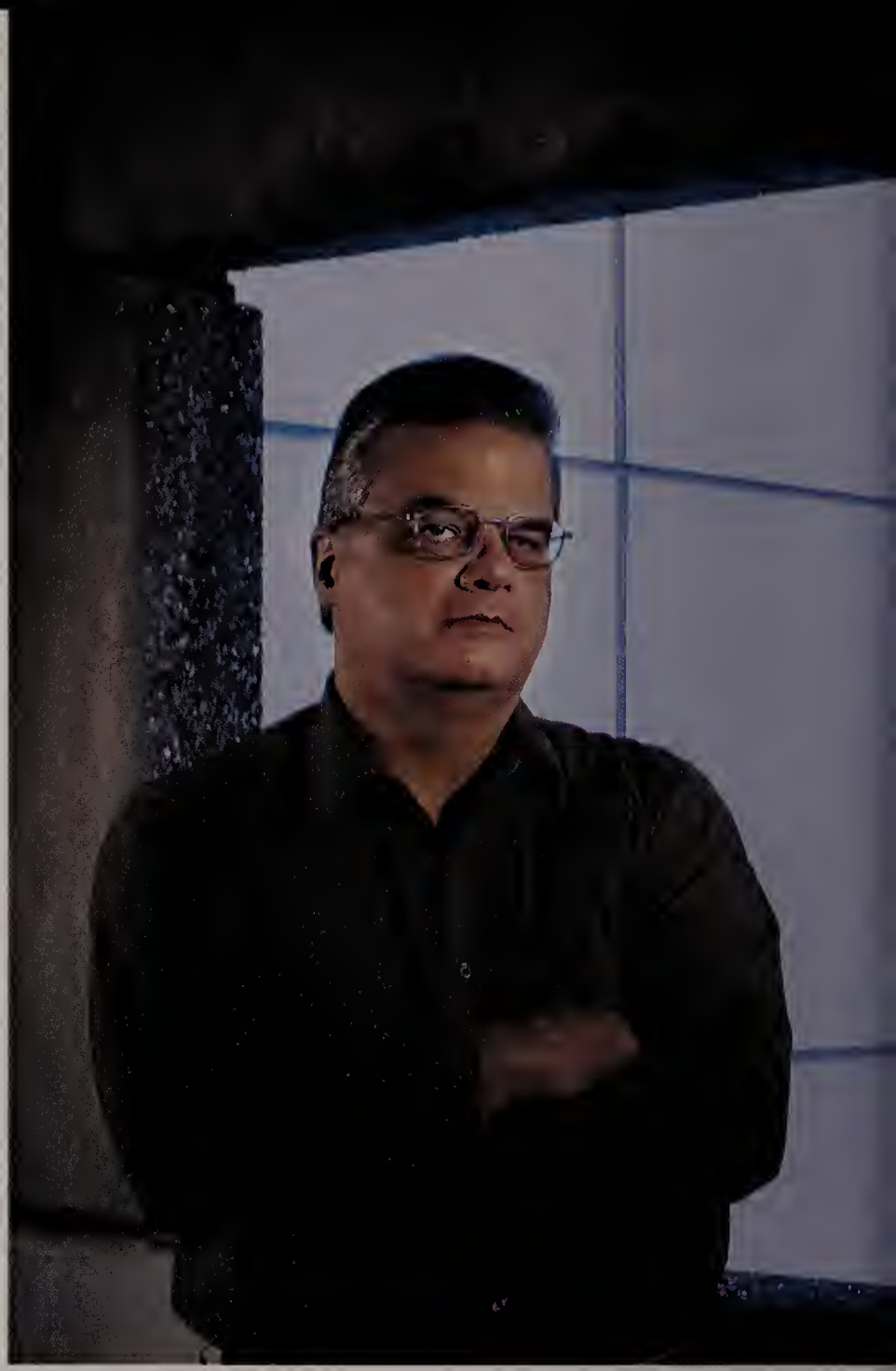
metrics. He took Polinter's history of IT spending and broke it down as a percent of revenue, per employee, per employee served by IT, per IT employee and per ton of finished chemical product (a common metric in the industry). "Using historical data is important," Novo says, "because then you can show executives how spending has changed over time and how it responds to changes in the business, such as during bad years when revenues fall."

Novo's goal was to get off the defensive and shift the discussion from an argument over numbers to an analysis of performance. "It's important to focus on what *you* are doing—not someone else," he says. "The CEO wants to understand why you're doing what you're doing and what you're doing to improve."

Yet hanging over his discussions with his boss was the suspicion that by offering his own numbers Novo was simply making excuses to avoid having to cut his budget. To allay those suspicions, he divided his numbers into two pots: IT spending on ongoing operations (essentially the infrastructure and the services needed to keep the lights on) and IT spending on new applications, research and services. By slicing the spending this way, Novo could focus cost-cutting scrutiny on those parts of his budget that he can and should be cutting, while preserving the portion of spending that, if cut, could threaten IT's ability to provide competitive differentiation.

"The smart IT people are continually tuning the infrastructure to make it lower cost and more efficient so they can free up more funds for new work and innovation," says Laurie Orlov, vice president and research director for Forrester Research.



On Toward Better Metrics

THE SAME THINKING as Novo's guided Drouin to begin giving his COO and CEO data on the cost of providing employees in TRW Automotive's different business units with ERP software. The idea, says Drouin, is to cut the costs of providing important capabilities to the business without endangering the capabilities themselves.

"We want to drill into more granular kinds of metrics so that we not only get a real apples-to-apples comparison but also so that we find areas that are really worth investigating," Drouin says. Like Novo, Drouin also separates out IT operations spending, but his accounting task was much more difficult than Novo's, who runs a highly centralized IT operation in a single, homogenous business. But Drouin says tracking costs on IT operations across all the business units was worth it. "We could show that the old legacy systems and infrastructures were costing us much more in some units than in others," he says. "It helped us drive our business case for buying a single ERP platform to serve all the units. The project caused us to raise our spending, but we could show that it would lower the cost of providing ERP over the longer term."

Another increasingly popular way of slicing up IT spending for CEO consumption is by employee. "I do it that way because it mirrors the way the business consumes my services, so it's something they can relate to," says Novo. Yet this metric also has its drawbacks. For example, in the chemical industry, where capital costs and levels of automation are high, the per-employee cost of IT will be high ($17,671 per employee, according to Forrester) compared with other, less capital-intensive manufacturing categories like industrial products ($4,302 per employee). The numbers will also be out of whack if the company has a lot of employees who never touch a computer (making the cost artificially low for employ-

More Good Metrics Talk

» Companies that **spend much less** on IT than the average for their industry are **three times more** successful than those in the middle. » But companies that **spend much more** than the average are **six times more** successful. SOURCE: CSC Consulting

PHOTO BY STAN KAADY

Former Polinter CIO **Douglas Novo**: "It's important to focus on what *you* are doing—not someone else."

ees who actually *do* use a computer) or if the company has outsourced much of its operations (which will raise the per-employee cost to a misleadingly high level because the outsourcer's employees will not be included in total IT spending). However, using the per employee metric in combination with percent of revenue can help determine whether two companies in the same industry really are comparable—if, for example, both spend the same on IT as a percent of revenue but have wildly different per-employee spending levels, chances are the business models, size, complexity or geographic spread of the companies are so different as not to be worth comparing, according to Gartner.

The accuracy of the total employees metric can be increased by slicing it up into actual users of IT, as Novo and other CIOs have done, eliminating from their calculations employees who don't consume any of IT's services. Hackett's Holland takes this a step further, taking into account nonhuman "users" in highly automated industries, like banks, where the per-unit spending on ATMs, for example, is every bit as important as the spending on a human teller or bank manager.

Talking Metrics with the Boss

THE DOWNSIDE of these more precise accountings of IT spending is that they get away from the simplicity of the percent-of-revenue benchmark that appeals to business executives. This is yet another reason why CIOs need to report to the CEO—or at least have a seat at the executive table. Springing these more nuanced metrics on the executive committee at budget time once a year just won't work. This kind of discussion needs to take place over time and, more importantly, in the context of the business's current strategy. For example, when Polinter went on an acquisition binge during the '90s, Novo added a per-acquisition breakdown to his spending metrics and began tracking how long it took to absorb a new business. He says that he was able to cut that time from 12 months to three months over four years. With regular access to the CEO (to whom Novo reported directly), Novo was able to align his IT spending—and cost cutting—to the company's acquisition strategy and justify the investments that helped facilitate it.

The more disconnected the CEO is from IT, the more likely he or she is to grasp at arbitrary averages to place the IT budget in context. And no CIO wants to be wholly judged by averages because that tends to make them and their departments average. For example, according to CSC's survey, companies that spend much less on IT than the average for their industry are three times more successful than those in the middle.

But companies that spend much more than the average are six times more successful.

A survey by Aberdeen Group found a correlation between poorly performing IT groups and their reliance on spending as a percent of revenue as their primary benchmark: 62 percent of the poor performers used it, while only 5 percent of top performers did. Furthermore, IT departments that are better connected with the CEO, the company strategy and the business have a greater ability to cut costs and enforce standards, according to Hackett's Holland. Without that connection, and without enforced standards, companies will have needlessly complex IT infrastructures, thanks to rogue spending on IT by the business units. "The companies with the complexity are the ones where the CIO is an order-taker," Holland says, "because those companies can't control purchasing decisions."

Part of the reason that spending as a percentage of revenue survives is because it describes IT spending in simple, familiar business terms. And for CEOs and CFOs, business terms, even overly simplified ones, are the way they think about and run the business.

"IT executives aren't good at describing IT work in business terms," says Forrester's Orlov. "They describe it in terms of technologies they are supporting. IT spending should be described in terms of growing revenue, lowering cost and improving the time it takes to do something. If all you talk about is uptime, you are a cost center, not a strategic partner."

"In the end, the real metric is not IT, it is business performance," says Dow's Kepler. "What is the output per employee? How efficient are we as a business per employee?

"If you're looking for a metric to justify IT spending, that's not the right mind-set," he adds. "The right mind-set is to understand how processes, systems and people tie together to get business results." CIO

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The Business Case for Paperless Medicine

A strong argument can now be made that doctors in small and midsize practices should invest in electronic health records. Here's how to get your physicians on board.

BY MICHAEL FITZGERALD

When the Vioxx recall hit in late September 2004, it was almost a yawner for Peter Basch. "It took us two or three minutes to figure out which of our patients were on it," says Basch, who is part of an eight-doctor practice in Washington, D.C. That two to three minutes was how much time it took to structure and execute a search for the practice's electronic records database.

Basch says that the Vioxx recall was a noncrisis for his practice largely because he and the other doctors have been using electronic health records (EHRs) for the past

Reader ROI

:: The value of EHRs for doctors in small and midsize practices

:: How to get doctors to invest in these systems

:: How to make sure the implementation is a success

ILLUSTRATION BY ALEX NABAUM

nine years. In fact, the first major drug recall occurred the same year Basch's practice started using EHRs. In September 1997, the Food and Drug Administration warned doctors against prescribing fenfluramine and phentermine (Fen-Phen) together as appetite suppressants. At that time, Basch's practice needed about 30 minutes to find all of its patients who were taking the diet pills. Basch, though, doesn't even think that quick-search capability is the best reason to use electronic health records. Instead, he points to not having to write out prescriptions.

One of his patients was on more than 15 medications and would never get them refilled. He had to write them all out for her twice a year. "That was incredibly painful," he says. "When I could do it in a couple of clicks, I was able to smile at her and say, 'Anything else?'"

Basch is a great white-coated hope for much of the medical industry—a doctor in a small practice who is using electronic health records and believes in them, he says, "with almost religious fervor." But such faith is sparse among doctors. Basch estimates that EHRs are used by no more than 15 percent of the 800 doctors employed by MedStar Health, the seven-hospital corporation that owns his practice. And so far only 14 percent of all the physicians in the United States have invested in EHRs, according to a 2005 survey by the Medical Group Management Association.

Many physicians say they simply don't see the financial upside for their practices, and some are concerned about retaining the confidentiality of patient information. (For more on health privacy concerns, read "The Electronic Bogeyman" on Page 68.)

"How do you convince a practice to spend between $20,000 and $40,000 a physician and decrease productivity and disrupt the practice for a year to make the change to these systems?" Basch asks. "That's a tough argument to make in the current environment."

The Argument for E-Medicine

Nonetheless, health insurers, hospitals, and state and federal agencies are determined to make that argument succeed, if only because of the potential of EHRs to improve the quality of health care and reduce its costs. A Rand Corp. study published in *Health Affairs* in the fall of 2005 estimated that the broad use of EHRs would cut $81 billion from operating costs. That same study estimated that if most hospitals used EHRs, it would eliminate 200,000 mistaken drug prescriptions a year, saving $1 billion. Then there are the countless hours that patients and staff spend filling out forms, and then finding them—one study estimates that doctors can't find the records needed for 30 percent to 40 percent of their patient visits.

The effort to accelerate the rate at which the hundreds of thousands of physicians in small practices who don't use electronic health records (roughly 75 percent of them) adopt such systems is proceeding on several fronts. The U.S. government has four major standards efforts under way to provide guidance for electronic data exchange by doctors, hospitals and insurers. Congress is also considering relaxing elements of the Federal Medicare and Medicaid Anti-Kickback laws and the Federal Anti-Referral Law so that hospitals might help doctors in their regions adopt electronic health record systems. (For more on the national health records initiative, read "What Happened to Do No Harm?" on Page 42.)

The physicians and IT executives who have taken the lead in implementing EHRs say there is a strong business case for investing in these systems. In interviews with *CIO*, these early adopters provide a number of valuable tips for how to make the business case to doctors in small and midsize practices and help them over the implementation hump. With national, state and local initiatives starting this year, they say, the momentum for widespread EHR adoption is building.

"It's happening very fast now. The funding to do it isn't there yet, there are cultural barriers, legislative barriers and privacy barriers—but there is now a national effort to overcome all of these barriers," says John

Five (Not So) Simple Steps to EHR

1 Figure out the business case. Individual practices may find they can pay for an electronic health records system (EHR) from saved costs, increased administrative efficiencies and, sometimes, increased patient flow.

2 Get buy-in. Make sure you get buy-in from all the doctors in your practice. The doctors must be committed as a group, and systems and practices must be uniform or the value of the EHR diminishes.

3 Consider your options. Give yourself plenty of time to decide how to go about funding the EHR system. Look to see if health information networks and pay-for-performance plans are available. These can make it easier to build a business case for EHRs.

4 Ensure support. Negotiate contracts to ensure that your vendor doesn't walk away after the implementation. Make sure contracts include ongoing training, service and support.

5 Prepare to change. EHRs force doctors, nurses and staff to change what they do, which creates potential for disgruntlement. Have a strategy to minimize these stresses.

–M.F.

The pay-for-performance reimbursement model—which works best when tracked by electronic health records—gives physicians a clear incentive to adopt an EHR system.

Halamka, CIO of the $1.2 billion CareGroup, a system of hospitals and practitioners that includes Beth Israel Deaconess.

Pay for Performance

The dynamite needed to break through these barriers, Halamka and others believe, will be pay-for-performance programs, a fundamental shift in the way insurers reward doctors for treating patients. Such programs are designed to reward doctors not only for seeing patients but for how they do on measures such as managing patients with chronic conditions like diabetes, or screening them for preventable problems like colon cancer. The pay-for-performance model would also reward doctors on qualitative measures like patient satisfaction.

Such incentives work best when tracked by electronic health records. Thus, pay-for-performance bonuses give physicians a clear incentive to adopt EHRs. Halamka says the reason he'll have all 3,000 of his group's physicians using electronic health records is because CareGroup's contract with Blue Cross Blue Shield came up for renewal last year, and it now includes a pay-for-performance component. He says that as other insurers' contracts come up for renewal, they'll put in the same incentives.

Pay-for-performance programs will start to counter the impediments that work against doctors investing in electronic health records, predicts Micky Tripathi, president and CEO of the Massachusetts eHealth Collaborative. The Collaborative is using a $50 million donation from Blue Cross Blue Shield of Massachusetts to link the hospitals and doctors in three Massachusetts communities on electronic health systems. It is the most ambitious pay-for-performance plan currently under way and is being watched closely, in large part because it puts all of the doctors in one area on systems and builds a health information exchange to connect them and the area's hospitals.

Patrick Barbier, a 62-year-old solo family practitioner in Newburyport, Mass., will be one of the very first doctors on the Collaborative system. He applied to be in the pilot because he thinks his patients will benefit from the consistency of care they'll be able to get when he's on vacation or off duty, because their records will be accessible to covering doctors. He also thinks e-prescription and lab systems will reduce his paperwork burden. "That will be a very good thing for me," Barbier says.

Wanted: Better Incentives

But others argue that physicians need to be given better incentives before they move toward wide-scale deployment of these systems. Jeffrey W. Rose, CEO of HealthAlliant, a nonprofit adviser to regional health information organizations, says that none of the pay-for-performance pilots currently under way offer enough payment to overcome the obstacles. "Ninety-plus percent of the benefits [of EHRs] accrue to others—insurers, hospitals and government entities," he says. "We expect physicians to make the investment even though others get the benefit."

Because of this cost/benefit dynamic, Rose and other physicians think that insurers and state and federal governments should put up more money for EHRs. For example, the American College of Physicians, which represents specialists in internal medicine, wants to see either low-cost loans or outright grants for physicians who plan to implement EHRs. Rose says that research on one of their large-scale projects showed that EHRs created $125 million in annual savings for medication management and another $100 million in diagnostics management. It also showed that 95 percent of the savings went to self-insured employers and commercial and government health-care plans. "They expect doctors to pay for this, and it just isn't fair," he adds.

But Dolores Mitchell, executive director of the Massachusetts Group Insurance Commission, disagrees. Mitchell has implemented a pilot program that tracks how individual physicians do on specific quality-of-care measurements so patients in the state-funded plan can see how their physicians perform; these physician profiles, which are culled from EHRs, could eventually be used in a pay-for-performance system. "There's a lot of push from doctors to say [we] should put up the money [for EHRs]. Well, think of everything else that goes into a doctor's office—if they put an MRI in their office, they don't ask me to pay for it. This is what it costs to be a modern, efficient, safe practice—it's a cost of doing business. You deal with that in two ways: You charge more money, and I believe the tax laws of this country still allow you to write it off as tax deduction."

Mitchell says doctors worry about system obsolescence, the overall cost of implementation and the changes in the way practices work. She's sympathetic to a point but hopeful that the pilot projects will show doctors that EHRs "only hurt for a minute." The hurt actually lasts for more like three

months. Basch tells doctors at MedStar Health, where he is medical director of e-health. Basch is helping to roll out EHRs from GE Physician Office to the roughly 800 doctors employed by MedStar Health, which had $2.7 billion in revenue and more than 1 million outpatient visits in its last fiscal year.

Basch says that the up-front costs are between $15,000 to $20,000 per physician, about 40 percent of which is the cost of hardware, including flat-screen monitors and networking equipment. He is nearing completion of a two-year rollout to 100 physicians, starting with practices that volunteered. Basch expects a variety of returns over the long run, including reduced medical errors, cost savings and improved quality of care. While large organizations like MedStar are well-positioned to gain benefits from EHRs, smaller practices that have adopted the systems find they can also get great returns.

Automatic Savings

Deborah Milburn, administrator at Dublin Primary Care, an eight-doctor practice in Colorado Springs, Colo., says it cost her practice about $12,000 per doctor to install an EHR from Amicore. That included updating hardware and giving doctors tablet PCs to carry around. "Where are these estimates of $20,000 to $40,000 per physician coming from?" Milburn wonders.

Dublin Primary Care generates $5 million or so in revenue a year, exactly the sort of practice that is supposed to be least able to afford to implement electronic health records. Milburn doesn't understand why. The practice decided back in 2002 to install an EHR system as a way to eliminate expenses like transcription costs, while giving more consistent treatment to patients.

Three years after turning it on, the system has done more than break even. Dublin Primary Care spends $10,000 a month less than it did in 2002, even figuring in $13,000 a month in IT costs. That's after three years of cost increases, staff raises and the like. Those savings have come from eliminating transcription costs, which were running at more than $6,000 a month in 2001, plus drops in costs for things like printing. But the biggest savings has come from decreased staff—Dublin has gone from 53 full-time staff to 38, without a drop in patients.

Milburn says that when Vioxx was recalled, she didn't even have to do a search; her vendor (Amicore) sent her software that executed the necessary queries. She also notes that the annual back-to-school headache of pulling immunization records is now relatively painless.

Another doctor who is on his second implementation of an EHR system says that both times it has paid for itself within the first year of use, and he doesn't understand why physicians aren't rushing to implement them. "It's astounding to those of us who've been to the mountaintop and seen the glory of them," says Joel Diamond of Diamond Fera and Associates in Harmerville, Pa.

Diamond says that in his first practice, a seven-doctor group with four locations, it cost $80,000 to implement an electronic health records system from Misys. But the elimination of transcription costs and 2.5 full-time positions in the first year covered the cost of the system. The practice also got so much better at coding and reimbursements that one of its payers audited it (the practice passed the audit with flying colors).

When Diamond and one of his partners left to form a new practice, they put in an EHR from the get-go. They knew it would work, and they also expect to see pay-for-

The Electronic Bogeyman

Privacy concerns could still derail widespread adoption of electronic health records

First came the news that Brigham and Women's Hospital in Boston had been mistakenly faxing confidential medical records to a local investment bank over a period of six months. Then, on the very same day in February, the press reported that U.S. doctors had been faxing confidential patient information to a small Canadian distributor of herbal remedies, also by mistake.

Imagine if those sensitive medical records were electronic and mistakenly got zipped off to a company e-mail list. Or hacked by crackers. That fear looms large for 86 percent of Americans, according to a recent survey by Health Industry Insights (HII), a unit of IDC (a sister company to *CIO*'s publisher).

"People are concerned about the ramifications of being treated for depression or having AIDS and having [that information] spill over into their personal lives and their jobs," says Marc Holland, author of the survey and program director of Health Industry Insights.

HII surveyed 1,095 Americans on various aspects of electronic health records (EHRs). Among its findings, 86 percent of respondents said they were somewhat or very concerned about having their confidentiality breached if electronic health records become commonplace.

Holland said that without substantial public education efforts, fear over privacy would be a major challenge in getting people to use EHRs. In addition, only 40 percent of those surveyed believed electronic health records would improve their care, and less than 35 percent thought EHRs would reduce the cost of care.

"What people don't realize is that more people are killed by error than by cancer," says Shannon Brownlee, Bernard F. Schwartz Senior Fellow at the New America Foundation, a think tank in Washington, D.C. Brownlee says she doesn't think that privacy issues will derail EHRs.

"Somehow we've managed to find ways to put our banking records online, take money out of a machine using a little wallet-sized card, and purchase goods over the Internet, all without an undue loss of financial privacy," Brownlee says. "Why on earth wouldn't we be able to find ways to keep medical records private?"

–M.F.

Electronic health records

fail for a variety of reasons—they're slower than paper in the beginning, and the network may not work well.

performance start to make it even more worthwhile to their bottom line. Under the pay-for-performance model, "people will lose money without an electronic medical records system," Diamond says. "There is no way to track your data without one."

Diamond and his partner have also started consulting on these systems, and spend time helping other members of the Pennsylvania Academy of Family Physicians think about them. He says the message is always: You will not lose money, you will save time, and your quality of care will go up exponentially.

Doctors Need Hand-Holding

Even so, many physicians remain leery of EHRs. That's largely because they've heard so many failure stories. "I've read that one-third of implementations fail," says Michael S. Barr, vice president of practice advocacy and improvement at the 119,000-member American College of Physicians.

EHRs fail for a variety of reasons—they're slower than paper in the beginning, and the network may not work well. Despite the hundreds of vendors on the market, fewer than 20 can handle the needs of large organizations. And not all vendors know what they're doing. In addition, learning how to use these systems can disrupt the doctor's practice and its workflow, and the whole process may seem daunting to many physicians.

Many early adopters say training is the key to success. EHRs often change a medical practice's basic workflow, even simple things like what to do with a lab report. So it takes time to train physicians and their staffs to use the new systems. Basch estimates that MedStar will take three to six months to train doctors and their staffs before their systems go live. And then once the system is live, MedStar will continue to provide support and follow-up training.

Likewise, CareGroup, which is essentially acting as an application service provider for its doctors, will do intensive up-front training. The key to its implementation, Halamka says, will be full-time onsite support and training for the entire first week after each of its practices starts using the system.

Similarly, the Massachusetts eHealth Collaborative is doing more than just furnishing doctors with hardware and software. It is providing training and support on all aspects of the system, including basics in how to connect the hardware and use the software, through June 2008. And it is seeding the pilot slowly, starting with only eight of the targeted 160 practices. As the pilot began in January, Tripathi estimated it would take 10 to 12 weeks to roll out the systems because the new EHRs need to be integrated with the physicians' existing systems for diagnostics and billing and practice management. Once all of the doctors' systems are up and running, the Collaborative plans to build out the networked health information exchanges. The overall goal is to have everything up and in place in all the networked facilities by July 2007.

Training and ample support will also be central to the health information exchange in Fishkill, N.Y. A. John Blair, who is president of the nonprofit Taconic IPA in Fishkill, has set up a company called MedAllies to implement a health information exchange for 500 doctors in 175 practices both inside and outside the IPA. Five hospitals and two national reference labs already use the health information exchange, primarily for lab results and tests.

MedAllies is now in the pilot stage of rolling out EHRs to more than a dozen practices. MedAllies plans to act as a systems integrator of sorts for these practices, coming in to study the workflow in the office before recommending a system to use, implementing the system and then training the doctors and staff on how to use the systems and adapt their workflow to them. MedAllies' staff is then available to handle further questions, which Blair thinks is a key for small practices; a vendor may do a good job implementing a system, but then it's off to the next customer. "Our certified trainers don't leave town," he says.

MedAllies plans to charge physicians about $500 a month to host and support the EHRs. But despite that relatively modest cost, Blair says he's going to be conservative and say that 100 doctors or more will be up on EHRs by the end of this year. However, Blair predicts 50 percent of the region's doctors will be using EHRs in three years and close to 100 percent in 10 years' time.

Halamka of CareGroup sees a similar timetable. He predicts it will still take about five years for most doctors in Massachusetts to be using EHRs, and about 10 years nationwide.

"I'm very excited," he says. "2006 is the year where economics and politics and demand [for EHRs] will all coincide." CIO

Michael Fitzgerald is a freelance writer living in Millis, Mass. Please send comments to Executive Editor Alison Bass at *abass@cio.com*.

The Next Generation

To read more about what medical schools are doing to train their students on how to use electronic health records, go to this story online at **www.cio.com/040106**.

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I.T. VALUE

IDEAS & INSIGHTS FROM **THE CIO EXECUTIVE COUNCIL** :: EDITED BY CHERYL ASSELIN

A New IT Value Vocabulary

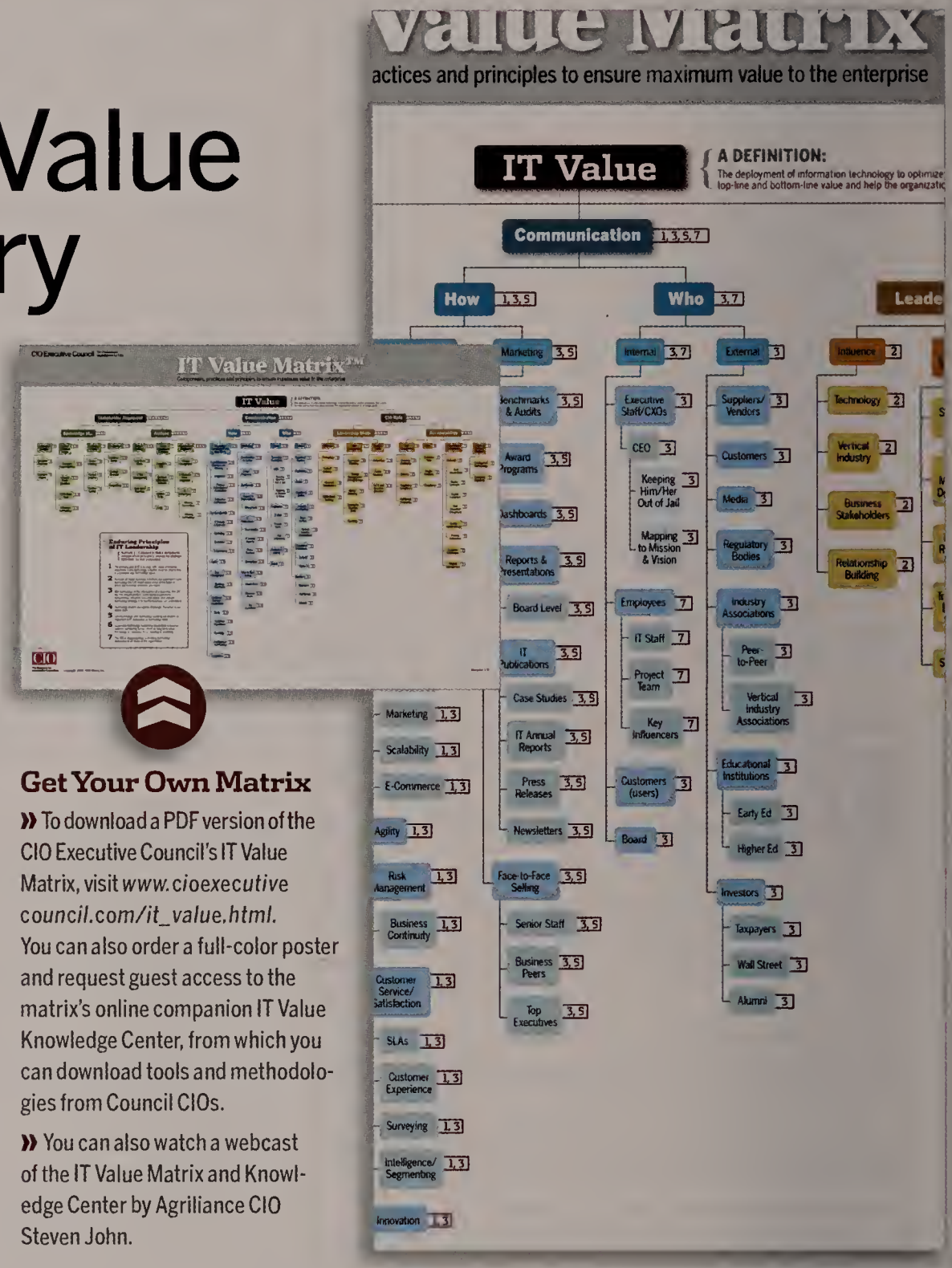
In fall 2004, at one of the initial meetings of the CIO Executive Council, members prioritized their professional challenges and chose several to collectively tackle to drive positive change. One was the need to clearly explain the value that IT brings to the enterprise. In most companies, there is no institutional understanding of why IT is essential. This gap in understanding places CIOs in the position of having to defend IT to the rest of the enterprise, a situation the Council CIOs were determined to change.

"Instead of continuing to be defensive about what we do, we decided to be proactive," says Kevin Humphries, senior VP of technology services at FedEx. The problem was that IT, unlike most other business functions, has no established lexicon to explain what it does and how it should work. Based on the decision to be proactive, a group of Council members, cochaired by Humphries, began creating a framework to describe in layman's terms what IT does to create value.

The result, after nearly 18 months of work by dozens of CIOs, is the IT Value Matrix, which illustrates the principles and practices essential to creating, identifying and communicating IT's value to the enterprise. The matrix identifies approximately 130 components, grouped under three key practice areas—stakeholder alignment, communication and the CIO role. It's organized for drilling down from general to specific. For example, to achieve stakeholder alignment, CIOs need both knowledge and action. To learn what type of knowledge, you drill down one level and find four types: stakeholder analysis, political and cultural issues, technology trends and business dynamics. "If you are weak in or not paying enough attention to a particular area, you are likely to have trouble succeeding," Humphries notes.

To make room in his office for the poster-sized version of the matrix, Agriliance CIO Steven John took down his prized, framed copy of *Superman* comic book No. 1. While Superman might inspire John and other CIOs to leap tall buildings, the matrix keeps them planted on solid ground.

"For me it's an anchor, a focusing tool," says John, who cochaired the task force with Humphries. "It's too easy to get sucked into the black hole



Get Your Own Matrix

» To download a PDF version of the CIO Executive Council's IT Value Matrix, visit *www.cioexecutivecouncil.com/it_value.html*. You can also order a full-color poster and request guest access to the matrix's online companion IT Value Knowledge Center, from which you can download tools and methodologies from Council CIOs.

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New IT Value Vocabulary *Continued from Page 70*

of day-to-day operations. This helps me focus on the strategic and the transformational."

As intended, the matrix is a focal point for conversations with businesspeople about how IT should relate to the enterprise. Marla Davidson, CIO of the Arthritis Foundation, says her quizzical business colleagues notice her interest in areas of the enterprise that are unrelated to technology. "This tool helps me explain what is expected of me and why I need to get involved in these areas," says Davidson.

Although the matrix was developed for Council members, they decided early on that it should be shared with the greater IT community, hence this article (see instructions for downloading the matrix on Page 70). "Its intention was noneconomic; CIOs built this simply to help one another," Humphries says.

CIOs who have come fresh to the finished matrix have already begun suggesting improvements, such as adding a social responsibility component. Others have found new ways to use it, including Mitch Davis, CIO of Bowdoin College, who passed out copies for his discussion with the governor's advisory committee in Maine. "The great thing about it is how adaptable it is," Humphries observes.

One unexpected adaptation is Case Western Reserve University's plan to develop an MBA course based on the matrix. The leadership, alignment and communication practices in the matrix are often overlooked in management education, says Fred Collopy, professor and IS department chair at Case's Weatherhead School of Management.

"This tool helps me explain what is expected of me and why I need to get involved in these areas."

–MARLA DAVIDSON, CIO, THE ARTHRITIS FOUNDATION

The MBA course will expose future business leaders to the soft but strategic principles and practices that make IT pay off. CIOs, paired with business officers from their companies, will frame a problem for the students to research and then engage them in high-level discussions of the students' proposed solutions. The course will be "entirely driven by topics in the matrix and the executives who framed it," says Collopy.

Education doesn't stop when the degree is earned, of course, and the broad array of practices the matrix depicts are being used by CIOs as development tools for current IT workers as well. For example, when a member of his staff recently asked John for guidance in becoming a CIO herself, "I walked her over to the poster and used it as a reference, pointing out areas where she had strengths and other areas she would need to develop," he says. Which is a lot more practical—but perhaps no less ambitious—than pointing to a *Superman* comic and advising, "be like him." CIO

Richard Pastore is the managing director of content development for the CIO Executive Council. Contact him at *rpastore@cio.com*.

[GUIDING PRINICIPLES]

Seven Keys to IT Leadership

The CIOs who created the IT Value Matrix wanted it to be timeless. "We needed a way to discuss what we do in terms that would never change," says Kevin Humphries, FedEx's senior VP of technology services.

The leadership principles that accompany the matrix form the strategic foundation to which all matrix components are tied. The principles were articulated with input from a panel of industry veterans, including retired CIOs Patricia Wallington and Darwin John.

The principles are as follows:

1] The primary goal of IT is to align with major enterprise objectives. Every initiative must be clearly tied in a provable way to business value.

2] Because all major business initiatives are dependent upon technology, the CIO must have a voice at the table at which key business decisions are made.

3] The CIO is responsible for understanding a business's complexities, influencing peers and presenting technology strategy in terms the business can understand.

4] Technology leaders are agents of change. Transition is our stable state.

5] Communication and relationship building are as important to IT leadership as technology skills are.

6] Successful technology leadership must strike a balance between competing forces: short-term versus long-term, technology versus business focus, leading versus enabling.

7] The CIO is responsible for cultivating technology leadership at all levels.

–R.P.

The CIO Executive Council is a professional organization for CIOs founded by CIO's publisher. To learn more about the Council, visit *www.cioexecutivecouncil.com* or contact Vice President of Development Dexter Siglin at *dsiglin@cio.com* or 508 935-4493.

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endlines

BY SCOTT KIRSNER

DEATH, TAXES AND MODERNIZATION

A History of Tipsy Returns

MUCH LIKE ROBERT GOULET trying to update his image, attempts by the IRS to revamp its computer systems are entertaining for their total futility. Since at least 1985, the IRS has been engaged in a long-running modernization push, spending money like an identity thief with a fistful of plastic and a penchant for Bentleys. (Last summer, Congress doled out another $199 million.) And the work doesn't seem anywhere close to being wrapped up in a bow and proudly packaged as a vendor case study.

Here, for the first time, is the complete chronicle of some of the lesser-known upgrade efforts in 1040-land.

1862 **President Lincoln** establishes an income tax to help cover the tab for the Civil War. Though the computer industry does not yet exist, future IT business development executives begin to salivate, sensing good fortune is heading their way.

1931 Several compatriots of **Al Capone**, as a "thank you" to the agency for launching an investigation of the Mob boss, "renovate" the Chicago IRS bureau, "cleaning out" several file cabinets.

1937 A consultant recommends a shift from standard lead pencils to mechanical pencils. Confusion about whether mechanical pencils can be inserted into pencil sharpeners delays work on tax returns until after World War II.

1959 A junior employee of the International House of Business Machines, responsible for writing new software for the IRS, spills a martini on a stack of punch cards. When the program is run, it triggers an investigation of **Frank Sinatra**.

1968 Using nothing more than plastic bags, cardboard and tape, **Gene Kranz** makes great progress fixing several IRS systems, but he is soon called away by NASA to serve as the flight director for the Apollo 13 mission.

1981 The Federal Aviation Administration recommends a systems integrator it has worked with. Two weeks later, the IRS's mainframes go out on strike. **President Reagan** orders them back on the job, and when they refuse, replaces them with managers dressed up as mainframes.

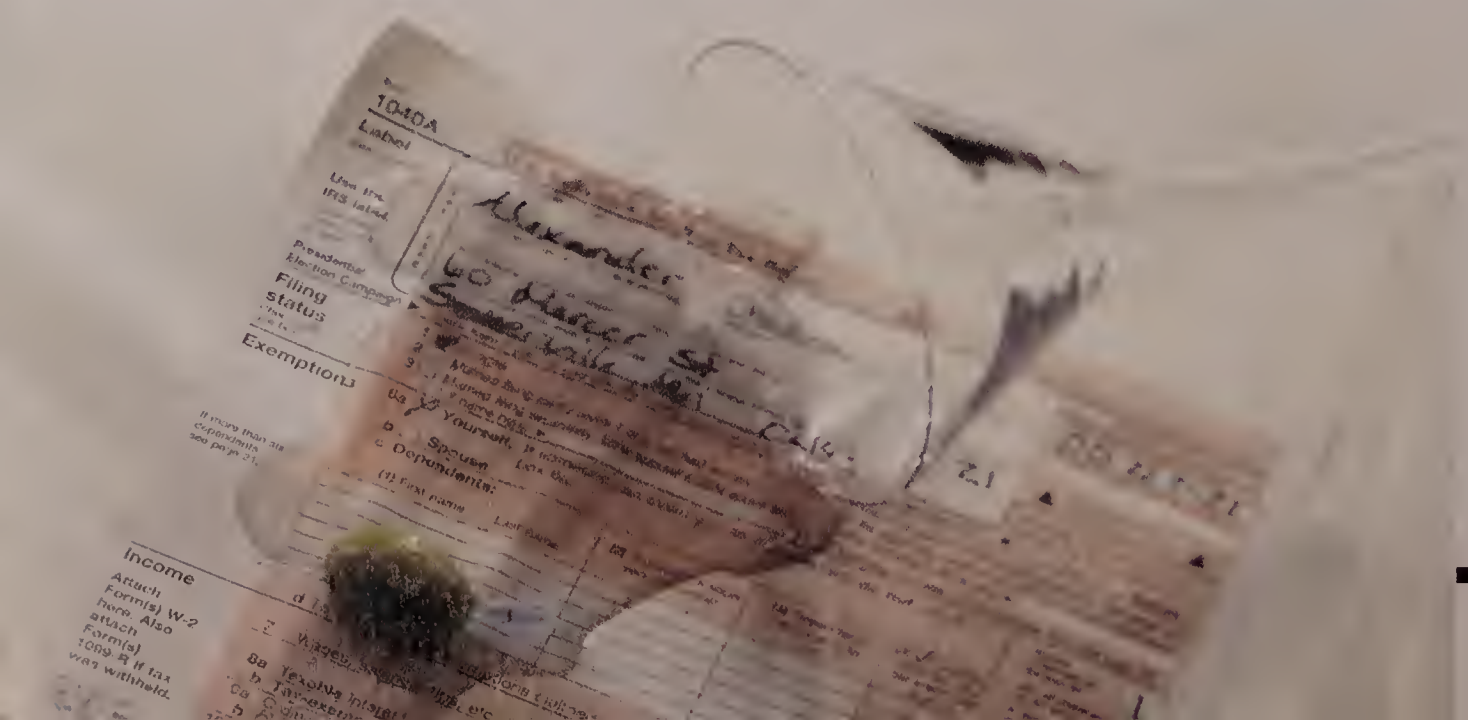
1992 A Silicon Valley startup, InnovaTronix, sells the agency a new software package that cuts in half the time required to process a return and identifies taxpayers trying to claim pets as dependents. Unfortunately, when InnovaTronix is acquired in 1993, the per-seat licensing fee triples. The following year, when InnovaTronix's acquirer is acquired, the product developed for the IRS is discontinued, and the agency is transitioned to software created to help large companies determine which employee has been putting tinfoil in the microwave.

1996 Agency hires Graybeard Associates, a systems integrator that says it can understand the arcane computer languages from the 1960s that run various IRS processes. IRS later discovers that one of the two project leaders from Graybeard is actually cryogenically frozen (but still billing hours). The other project leader is hired away by Methuselah Partners.

1999 DSD, a firm well-known for its reengineering projects, promises to complete its work by 01/01/01. The consultancy later explains that its internal systems accept only two-digit numbers: What it meant was January 1, 3001.

2002 Outsourcing work to Vindaloo Global Services in India saves the IRS 30 percent of its annual operating costs. It isn't until the following year that the agency notices that all refund checks have been issued in rupees.

2006 Having run out of systems integrators gutsy enough to bid on IRS projects, the agency decides to put its entire data center on a flatbed truck, drive it to a nearby Jiffy Lube and ask for "the works."



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